

## REPORTS

SUPERFUND RECORDS CTR	
Site:	<i>Sullivan's Ledge</i>
Break:	<i>8.3</i>
Other:	<i>001</i>

558894



SDMS DocID

558894

**Site Closure Plan**

**ARAR Review**

**Implementation/Material  
Handling Plan**

**Operations and Maintenance Plan**

**Post-Construction  
Environmental Monitoring Plan**

**June 1996**

**Sullivan's Ledge Superfund Site  
New Bedford, Massachusetts**



**O'BRIEN & GERE**  
ENGINEERS, INC.



**O'BRIEN & GERE**  
ENGINEERS, INC.

June 28, 1996

Mr. David O. Lederer  
Remedial Project Manager, Waste Management Division  
United States Environmental Protection Agency  
Massachusetts Superfund Section  
Waste Management Division - HRS-CAN3  
JFK Federal Building  
Boston, MA 02203

RE: Sullivan's Ledge Superfund Site  
FILE: 5509.003  
SUBJ: Plans

Dear Dave:

Per our letter of June 10, 1996, please find enclosed the following:

- Site Closure Plan
- ARAR Review
- Implementation/Material Handling Plan
- Operations and Maintenance Plan
- Post Construction Environmental Monitoring Plan

These plans will be revised to incorporate north of Hathaway Road issues after EPA's review of the north of Hathaway Road design package.

Very truly yours

O'BRIEN & GERE ENGINEERS, INC.

James M. O'Loughlin, P.E.  
Senior Project Engineer

s127\corres\plans.let

cc: A. Carreiro  
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T. Jordan  
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Section 2	ARAR Review
Section 3	Implementation/Material Handling Plan
Section 4	Operations and Maintenance Plan
Section 5	Post-Construction Environmental Monitoring Plan



**REPORT**

## **Site Closure Plan**

**Sullivan's Ledge Superfund Site  
New Bedford, Massachusetts**

**June 1996**



**O'BRIEN & GERE**  
ENGINEERS, INC.

**REPORT**

## **Site Closure Plan**

**Sullivan's Ledge Superfund Site  
New Bedford, Massachusetts**

**June 1996**

Report

# Site Closure Plan

*Sullivan's Ledge Superfund Site  
New Bedford, Massachusetts*

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Thomas A. Jordan, PE, LSP  
Vice President

June 1996



1200 Crown Colony Drive  
Quincy, Massachusetts

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## 1. Introduction

Section VII B of the Statement of Work (SOW) for Operable Unit 1 requires the development of a Closure Plan for the First Operable Unit which complies with 310 CMR 30.580, and which includes the following:

1. Demonstration of Compliance

*Settling Defendants shall prepare a plan for demonstrating to EPA that source control and ground water response actions have attained all Cleanup Standards and Performance Standards at all points of compliance within the boundaries of the First Operable Unit, consistent with the Consent Decree.*

2. Source Control

*Settling Defendants shall demonstrate compliance with the following source control closure requirements:*

- a. *Excavation and treatment, as necessary, of soils with contaminant levels above the Soil Cleanup Standards, as described in Section IV of this SOW.*
- b. *Excavation and treatment, if necessary, of sediments with contaminant levels above the Sediment Cleanup Standard, as described in Section IV of this SOW, from the Un-named Stream, its tributaries and the first water hazard, and a portion of the second water hazard, as shown generally in Attachment 3 of this SOW.*
- c. *Construction of a cap, with a permeability less than or equal to  $10^{-7}$  cm/sec, as described in Section IV.F of this SOW.*
- d. *Fill and restoration of excavated areas as described in Section IV.E of this SOW.*

- e. *Restoration/enhancement of affected wetlands as described in Section VI.A of this SOW.*
- f. *Attainment of all Performance Standards described in Sections IV.H and VI.C of this SOW, consistent with the Consent Decree.*

3. *Management of Migration*

*Consistent with the Consent Decree, the Settling Defendants shall demonstrate compliance with the following ground water remedy closure requirements:*

a. *Active collection system*

*Consistent with the Consent Decree, upon demonstrating that the ground water treatment system has attained the Ground Water Cleanup Standards at all points of compliance and upon approval by EPA, in consultation with DEP, the collection system may be shut down and Settling Defendants shall implement a three-year performance monitoring program consistent with 310 CMR 30.660 and 310 CMR 675, including 310 CMR 30.672(4), as specified in Section V.C of this SOW.*

*If, at the conclusion of the three-year performance monitoring period, Ground Water Cleanup Standards continue to be achieved, as specified in this SOW, then the Settling Defendants shall submit a report to EPA demonstrating compliance. Upon written approval by EPA, in consultation with DEP, the Settling Defendants may terminate quarterly ground water monitoring, and shall implement long-term monitoring, consistent with the Consent Decree and as described in Section VI.B of this SOW.*

b. *Passive collection system*

*Consistent with the Consent Decree, upon demonstrating that the ground water treatment system has attained the Ground Water Cleanup Standards at the point of compliance and, upon approval by EPA, in consultation with DEP, the collection system may be shut down and Settling Defendants shall implement a three-year performance monitoring program consistent with 310 CMR 30.660 and 310 CMR 675, including 310 CMR § 30.675(4), as specified in Section V.C of this SOW.*

*At the conclusion of the three-year performance monitoring period, if Ground Water Cleanup Standards continue to be achieved, as specified in this SOW, then the Settling Defendants shall submit a report to EPA demonstrating compliance. Upon written approval by EPA, in consultation with DEP, the Settling Defendants may terminate quarterly ground water monitoring, and shall implement long-term monitoring, consistent with the Consent Decree, as described in Section VI.B of this SOW.*

c. *Attainment of all Performance Standards described in Sections V.E and VI.C of this SOW, consistent with the Consent Decree.*

4. *Institutional Controls*

*Settling Defendants shall conduct yearly reviews to monitor the implementation of the institutional controls specified in Section VII.A. of this SOW.*

310 CMR 30.583 (Contents and Approval of the Closure Plan) provides the following requirements which are relevant to Operable Unit 1 of the Sullivan's Ledge Site:

310 CMR 30.583(1)(d): A detailed description of the methods to be used during closure(s), including, but not limited to, methods for removing, transporting, treating, storing, or disposing of all hazardous wastes, and identification of the type(s) of the off-site hazardous waste management units to be used, if applicable.

310 CMR 30.583(1)(e): A detailed description of the steps needed to remove hazardous waste residues from, or decontaminate, all contaminated containment system components, and all facility equipment, structures, and soils during closure (s). This description shall include, but not be limited to, procedures for cleaning equipment and removing contaminated soils, methods for sampling and testing surrounding soils, and criteria for determining the extent of decontamination required to comply with the closure performance standard, 310 CMR 30.582.

310 CMR 30.583(1)(f): A detailed description of other activities necessary during the period of each closure to ensure that all closures comply with the closure performance standard, 310 CMR 30.582. This description shall include, but not be limited to, ground water monitoring, leachate collection, and run-on and run-off control.

310 CMR 30.583(1)(h): A description of how the requirements of 310 CMR 30.580 and 30.633 will be complied with.

This document presents the Closure Plan for Operable Unit 1 of the Sullivan's Ledge Superfund Site. The Closure Plan is organized by remedial tasks, as presented in Section VII B of the SOW. This Closure Plan also complies with the applicable requirements of 310 CMR 30.580.

---

## 2. Source control

This section addresses the requirements of Section VII.B.2 of the SOW.

### 2.1. Soils

#### 2.1.1. Requirements

Section VII.B.2.a of the SOW requires the following:

*Excavation and treatment, as necessary, of soils with contaminant levels above the Soil Cleanup Standards, as described in Section IV of this SOW.*

Section IV.A.1 of the SOW provides the following cleanup standards for soils:

1. Cleanup Standards for Unsaturated Soils

- a. *Unsaturated soils within the Disposal Area, as shown generally in Section A of Attachment 1 of this SOW:*

Hazardous Substances Cleanup

	<u>Standards (Excavation and Solidification Criteria)</u>
<i>Total PCBs</i>	<i>50 ppm</i>
<i>Total carcinogenic PAHs</i>	<i>30 ppm</i>

- b. *Unsaturated soils outside the Disposal Area, as shown generally in Section B of Attachment 1 of this SOW:*

Hazardous Substances Cleanup Standard

Total PCBs	10 ppm (excavation criteria) 50 ppm (solidification criteria)
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Section IV.C.1 of the SOW provides the following limits of excavation:

*From areas within and outside the Disposal Area, as generally delineated in Section A and Section B of Attachment 1 to this SOW, Settling Defendants shall excavate soils contaminated above the excavation criteria of Soil Cleanup Standards in accordance with the following table:*

Depth of seasonal low  
Ground water table

Depth of excavation

*0 - 5 ft below ground surface*

*Depth of contamination up to a maximum of 5 ft below ground surface*

*5 - 9 ft below ground surface*

*Depth of contamination up to a maximum depth of the seasonal low ground water table*

*Greater than or equal to 9 ft*

*Depth of contamination up to a maximum depth of 9 ft below ground surface*

Section IV.G.3 of the SOW includes the requirement that confirmational sampling be conducted upon completion of excavation.



The requirements of Sections IV.A.1 and IV.C.1 of the SOW were modified by the Explanation of Significant Differences (EPA, 1996). Specifically:

*Under the revised remedy, soil in the Disposal Area outside of the floodplain section will not be excavated and, therefore, will remain untreated. That soil will remain in place and be covered by the cap. Consistent with the OU-1 ROD, the cap will be constructed over the entire surface area of the Disposal Area, except for the floodplain section. Also consistent with the OU-1 ROD, Disposal Area unsaturated soil in the floodplain that is contaminated above excavation cleanup standards (50 ppm PCBs and/or 30 ppm PAHs) will be excavated and disposed of beneath the landfill cap, outside of the floodplain. As described below, under the revised remedy, excavated soil from the floodplain shall also remain untreated.*

*In addition, as explained in this ESD, off-site soil and stream sediments that exceed solidification cleanup standards (soil - 50 ppm PCBs; sediments - 20 micrograms per gram of carbon) will not be treated. Instead, off-site soil and sediments that exceed excavation criteria (soil - 10 ppm PCBs; sediments - 20 micrograms per gram of carbon) shall be excavated and disposed of beneath the landfill cap, outside of the floodplain.*

#### **2.1.2. Plan to comply with requirements**

The Explanation of Significant Differences requires the excavation of soils from areas on the Disposal Area which have been modeled to flood as a result of the 24-hr, 100-yr storm, and excavation of soils from a parcel adjacent to the Disposal Area (the car wash property). Excavated soils are to be placed beneath the cap.

The City of New Bedford, which is the current owner of the Disposal Area, has an agreement with the Sullivan's Ledge Site Group to acquire the adjoining property immediately east of the Disposal Area. Therefore, a comprehensive approach for both parcels was proposed in the Design Criteria Report (May 1995) and in the 30% Design Report (December 1995).

The comprehensive approach consisted of:

- Augmentation of the capacity of the culverts beneath Hathaway Road to eliminate the potential flooding condition on the Disposal Area.
- Lining of the Un-named Stream using a 72-inch concrete pipe. Lining would begin at the I-195 interchange and proceed downstream. Installation of the 72-inch concrete pipe on a soil-cement bedding to minimize the formation of a migration pathway for ground water. Backfilling the space between the exterior pipe walls and the former stream channel with clay to further minimize the formation of a migration pathway for ground water.
- Diversion of the Un-named Stream during construction using baseflow pumping. Larger storms would be diverted through the installed 72-inch concrete pipe. To minimize potential erosion during larger storm events, excavation along the stream bank would be limited. For example, excavation could be limited to 200 ft ahead of installed concrete pipe, which represents approximately five days of production time. Conventional storm water management procedures, such as silt fencing and the use of haybales, would also be implemented as appropriate.
- Installation of the passive ground water collection system in a trench that is parallel to the former stream bed. The trench would be installed on relatively level ground, just beyond the slope of the stream bank. Installation of the passive ground water collection system at this location will enable construction to proceed independently of stream lining, will minimize construction activity in the stream bed, and will facilitate placement of the shallow collection system on bedrock, which may be more irregular in form closer to the stream channel.
- Extension of cap membrane and an underlying support system past the former Disposal Area, over the shallow trench, down the slope of the former stream bank. The membrane would be placed in the clay between the 72-inch concrete pipe and the stream bank. After backfilling the

former Un-named Stream channel, a second membrane would be welded to the first membrane and extended over the backfilled stream channel.

- Construction of geomembrane-lined drainage swale for the cap over the Un-named Stream division piping.

The comprehensive approach will eliminate the potential flooding condition on the Disposal Area; therefore, excavation of "floodplain soils" will not be required. Soils west of the Un-named Stream will be capped in place, and therefore will not require excavation.

Soils which are east of the Un-named Stream and which exceed off-site soil clean-up criteria will be excavated and placed beneath the cap. These soils are shown on Sheet G-12 of the contract drawings; specification 02228 "Soil and Debris Restoration" describes requirements for soil excavation and confirmational sampling.

## 2.2. Sediments

### 2.2.1. Requirements

Section VII.B.2.b of the SOW requires the following:

*Excavation and treatment, if necessary, of sediments with contaminant levels above the Sediment Cleanup Standard, as described in Section IV of this SOW, from the Un-named Stream, its tributaries and the first water hazard, and a portion of the second water hazard, as shown generally in Attachment 3 of this SOW.*

Section IV.A.1 of the SOW provides the following clean-up standards for sediments:

Cleanup Standard for Sediments in the Un-named Stream, its Tributaries and the First and Second Water Hazards.

Hazardous substance

Cleanup standard

Total PCBs

20 micrograms per gram of carbon

Section IV.C.2 of the SOW includes the following requirements for sediment excavation:

- Excavation of sediments in excess of the clean-up standard from the Un-named Stream, its tributaries, the first water hazard, and a portion of the second water hazard.
- Initial depths of excavation of 1 ft in the Un-named Stream and 2 ft in the water hazards
- Methods of stream diversion
- Methods to minimize impacts to wetlands
- Surface water monitoring during excavation
- Confirmational sampling upon completion of excavation
- Methods to restore impacted wetlands.

#### **2.2.2. Plan to comply with requirements**

Sediments which exceed clean-up standards will be excavated and placed beneath the cap. The portions of the Un-named Stream and water hazards which will be excavated are shown on sheets G-12, G-\_\_\_\_, and G-\_\_\_\_ of the Contract Drawings. These sheets also show depths of initial sediment excavation. These depths meet or exceed the requirements of Section IV.C.2 of the SOW. In addition, the entire second water hazard is proposed for excavation, as opposed to only a portion.

Sheets G-11, G-\_\_\_\_, G-\_\_\_\_, and G-\_\_\_\_ of the Contract Drawings show proposed methods of stream diversion during construction. Specification 02226 "Sediment Excavation and Placement" describes requirements for sediment excavation and confirmational sampling.

Wetlands associated with Operable Unit 1 were characterized in the report titled "Wetlands Characterization Report" (O'Brien & Gere Engineers, Inc., 1995). Wetlands and habitats impacted as a result of remedial activity will be restored in accordance with the Wetlands Restoration Plan.

[NEED TO COMPLETE REFERENCES AND WETLANDS RESTORATION PLAN AFTER SUBMISSION OF NORTH OF HATHAWAY ROAD COMPONENT OF DESIGN.]

## 2.3. Cap

### 2.3.1. Requirements

Section VII.B.2.C of the SOW requires the following:

*Construction of a cap, with a permeability less than or equal to  $10^{-7}$  cm/sec, as described in Section IV.F of this SOW.*

Section IV.F of the SOW requires the following:

- A cap will be constructed over approximately eleven acres of the Disposal Area, outside the area of the 100-year floodplain.
- The cap shall consist of the four layers shown in Attachment 7 to the SOW, unless EPA, in consultation with DEP, approves an alternative design.
- The base of the cap shall have an impermeable layer with a permeability less than or equal to  $10^{-7}$  cm/sec.
- Water passing through the upper layers of the cap shall drain off to the sides of the cap, over the impermeable layer. This water shall be collected in drainage swales around the edge of the cap, and discharge to the Un-named Stream.
- Erosion control measures will be implemented during construction. Disturbance of contaminated soils and adjacent wetland areas will be minimized during construction.
- Long-term operation and maintenance of the cap will be provided, including monitoring and maintenance programs to ensure the integrity of the cap.

### 2.3.2. Plan to comply with requirements

The aerial extent of the cap is shown on sheet G-6 of the Contract Drawings. The cap covers approximately 12.5 acres. An additional culvert is being installed beneath Hathaway Road for the Un-named Stream, as shown on sheets G-11, G-14, and S-5 of the Contract Drawings. Potential flooding of the Disposal Area will be eliminated by this additional culvert.

The cap cross section is shown on Sheet G-6. This cross section was proposed by EPA in a letter dated January 12, 1995, and was incorporated into the design with the Design Criteria Report (O'Brien & Gere Engineers, Inc., 1995) and the Preliminary Design Report (O'Brien & Gere Engineers, Inc., 1995). Specifications for cap materials include:

<u>Specification</u>	<u>Title</u>
02290	Gas Venting Layer
02291	Geogrids
02292	Geosynthetic Clay Liner
02293	Flexible Membrane (LLDPE) Cover
02294	Synthetic Drainage Layer
02295	Barrier Protection Layer
02981	Top Soil and Seeding

The geosynthetic clay liner has a maximum permeability of  $5 \times 10^{-9}$  cm/sec; the flexible membrane (LLDPE) has a maximum permeability of  $1 \times 10^{-12}$  cm/sec.

Water passing through the upper layers of the cap will be collected and discharged to the sedimentation basin, as shown on sheets G-6, G-13, and G-14 of the contract drawings. Erosion control measures will be implemented during construction, as described in specification 01140 "Storm Water Pollution Prevention Plan".

Post closure maintenance of the cap and associated run-on/run-off control systems is described in the Operations and Maintenance Plan.

## 2.4. Fill and restoration of excavated areas

### 2.4.1. Requirements

Section VII.B.2.d of the SOW requires the following:

*Fill and restoration of excavated areas as described in Section IV.E of this SOW.*

Section IV.E of the SOW includes the following applicable requirements:

- Disposal of excavated soils and sediments beneath the cap on pre-existing ground surface, at least 4 ft above the probable high ground water surface.
- Avoidance of extended exposure of excavated soils and sediments.
- Restoration of excavated areas which are beyond the boundaries of the cap by backfilling with clean fill, grading, loaming, and seeding.

### 2.4.2. Plan to comply with requirements

Specifications 02226 "Sediment Excavation and Placement" and 02228 "Soil and Debris Relocation" include requirements for:

- Placement of excavated soil and sediment and Disposal Area
- Avoidance of extended exposure of excavated soils and sediments (at the point of excavation).
- Restoration of surfaces beyond the boundaries of the cap.

Specifications 01140 "Storm Water Pollution Prevention Plan", 01150 "Construction Water Management Plan", and 01170 "Material Handling Plan" include requirements for minimizing exposure of excavated soils and sediments, including minimization of exposure at the point of placement for disposal.

[NEED TO COMPLETE SPECIFICATION 02226 AND SUBMIT WITH NORTH OF HATHAWAY ROAD COMPONENT OF DESIGN.]

## **2.5. Restoration/enhancement of affected wetlands**

### **2.5.1. Requirements**

Section VIII.B.2.e of the SOW requires the following:

*Restoration/enhancement of affected wetlands as described in Section VI.A of this SOW.*

Section VI.A of the SOW includes detailed requirements for the wetlands restoration program.

### **2.5.2. Plan to comply with requirements**

The Wetlands Restoration Plan (O'Brien & Gere Engineers, Inc., 1996) has been prepared as a separate document to comply with the requirements of Section VI.A of the SOW.

[NEED TO COMPLETE WETLANDS RESTORATION PLAN AND SUBMIT WITH NORTH OF HATHAWAY ROAD COMPONENT OF DESIGN.]

## **2.6. Attainment of performance standards**

### **2.6.1. Requirements**

Section VII.B.2.f. of the SOW requires the following:

*Attainment of all Performance Standards described in Sections IV.H and VI.C of this SOW, consistent with the Consent Decree.*

These requirements are addressed separately in Section 2.6.2 below.



## 2.6.2. Plan to comply with requirements

### 2.6.2.1. TSCA chemical waste landfill standards under 40 CFR 761.75(b)

Section IV.H.1.9 of the SOW requires compliance with 40 CFR 761.75(b), with exception of 761.75 (b)(1)(2), and (3). A copy of 40 CFR 761.75(b) is included in Appendix A.

The following technical requirements of 40 CFR 761.75 are relevant to the design and have been achieved:

- 761.75(b)4: The culverts at Hathaway Road will be augmented to carry the potential flood from the 100-yr storm away from the site. See sheets G-11, G-20, S-4, and S-5 of the Contract Drawings. Run-on control has been designed for the 24-hr, 100-yr storm. See sheets G-6, G-11, G-13, G-19, G-20, S-4, S-5, and S-6 of the Contract Drawings.
- 761.75(b)5: As shown on sheet G-6 of the Contract Drawings, the design maximum cap slope is 4H:IV and in most cases 5H:IV is not exceeded. The design also includes the use of textured liners in certain areas as an additional precaution.
- 761.75(b)6: Ground water and surface water monitoring for the site is consistent with the SOW, and is described in the Post-Construction Environmental Monitoring Plan.
- 761.75(b)7: The design of the passive collection system includes a shallow collection trench and a pump station, as shown on sheets G-7, G-8, G-9, and M-14 of the Contract Drawings and as described in specification 02562 "Ground Water Collection System Piping" and specification 11302 "Ground Water Collection Trench Pumps".
- 761.76(b)8: Specification 02228 "Soil and Debris Relocation" includes requirements for managing liquids and containers during construction.

761.75(b)9: As shown on sheets G-6 and G-15 of the Contract Drawings, the design includes access roads and fencing. Requirements for operating and maintaining the cap are described in the Operation and Maintenance Plan.

**2.6.2.2. Landfill standards under 310 CMR 30.620**

Section IV.H.1.b of the SOW requires compliance with landfill standards under 310 CMR 30.620, with the exception of double liner requirements. A copy of 310 CMR 30.620 is included in Appendix A; a synopsis of how relevant design standards have been achieved is presented below:

The following technical requirements of 310 CMR 30.620 are relevant to the design and have been achieved:

622(4): The shallow ground water collection system design is shown on sheets G-7, G-8, and G-9 of the Contract Drawings and described in specification 02562 "Ground Water Collection System Piping".

622(5): Run-on control has been designed for the 24-hr, 100-yr storm. See sheets G-6, G-11, G-13, G-19, G-20, S-4, S-5, and S-6 of the Contract Drawings.

622(6): Run-off control has been designed for the 24-hr, 100-yr storm. See sheets G-6, G-11, G-13, G-19, and G-20 of the Contract Drawings.

622(7): The run-on and run-off control systems will be maintained. See Operation and Maintenance Plan.

622(8): The design includes perimeter air monitoring during construction. See specification 01130 "Perimeter Air Monitoring and Dust Control Plan".

622(9): The design includes a gas venting system with perimeter gas monitoring wells. See sheets G-6 and G-21 of the Contract Drawings and the Post-Construction Monitoring Plan.

622(10): The design includes access roads. See sheets G-6 and G-20 of the Contract Drawings.

622(11): Run-off from the cap will be directed to the Un-named Stream, as is the current case.

623: The following specifications require that the manufacturer submit a statement indicating that the cover materials are compatible with the concentrations of constituents found in shallow ground water.

<u>Specification</u>	<u>Title</u>
02291	Geogrids
02292	Geosynthetic Clay Liner
02293	Flexible Membrane (LLDPE) Cover
02294	Synthetic Drainage Layer

624: Specification 02293 "Flexible Membrane (LLDPE) Cover" includes detailed requirements for liner testing.

629: Specifications 02060 "Building Demolition", 02226 "Sediment Excavation and Placement", and 02228 "Soil and Debris Relocation" discuss procedures for managing liquids.

630: Specification 02228 "Soil and Debris Relocation" discusses procedures for managing containers.

631: In accordance with the Record of Decision, on-site soils, sediments, and debris are proposed for consolidation and inclusion beneath the cap. Other materials, such as PPE and construction water sediment, are site related and will also be placed beneath the cap.

633(1): The cover has been designed to meet these requirements. See sheets G-6 and G-17 of the Contract Drawings, and also the Settlement Analysis Report (O'Brien & Gere, September 1995).

633(2): These requirements are discussed in the Operations and Maintenance Plan.

#### **2.6.2.3. Permeability of solidification soils and sediments**

Section IV.H.1.C of the SOW requires that the permeability of solidified soils and sediments be less than or equal to  $10^{-6}$  cm/sec after placement in the Disposal Area. This requirement is no longer applicable, as described in the Explanation of Significant Differences (EPA, 1996).

#### **2.6.2.4. Diversion structures**

Section IV.H.1.d of the SOW requires that diversion structures be designed in accordance with TSCA 40 CFR 761.75(b)(4)(ii).

The culverts at Hathaway Road will be augmented to carry the potential flood from the 100-yr storm away from the site. See sheets G-11, G-20, S-4, and S-5 of the Contract Drawings. Run-on control has been designed for the 24-hr, 100-yr storm. See sheets G-6, G-11, G-13, G-19, G-20, S-4, S-5, and S-6 of the Contract Drawings.

#### **2.6.2.5. Cap permeability**

Section IV.H.2.a. of the SOW requires that the cap be constructed with a permeability which is less than or equal to  $10^{-7}$  cm/sec.

The cap cross section is shown on Sheet G-6. This cross section was proposed by EPA in a letter dated January 12, 1996, and was incorporated into the design with the Design Criteria Report (O'Brien & Gere Engineers, Inc., 1995) and the Preliminary Design Report (O'Brien & Gere Engineers, Inc., 1995). Specifications for cap materials include:

<u>Specification</u>	<u>Title</u>
02290	Gas Venting Layer
02291	Geogrids
02292	Geosynthetic Clay Liner
02293	Flexible Membrane (LLDPE) Cover
02294	Synthetic Drainage Layer
02295	Barrier Protection Layer
02981	Top Soil and Seeding

The geosynthetic clay liner has a maximum permeability of  $5 \times 10^{-9}$  cm/sec; the flexible membrane (LLDPE) has a maximum permeability of  $1 \times 10^{-12}$  cm/sec.

Water passing through the upper layers of the cap will be collected and discharged to the sedimentation basin, as shown on sheets G-6, G-13, and G-14 of the Contract Drawings. Erosion control measures will be implemented during construction, as described in specification 01140 "Storm Water Pollution Prevention Plan".

Post closure maintenance of the cap and associated run-on/run-off control systems is described in the Operations and Maintenance Plan.

#### **2.6.2.6. Long-term minimization of migration of liquids**

Section IV.H.2.b of the SOW requires that the cap be designed to provide long-term minimization of migration of liquids through the landfill, in accordance with Massachusetts closure and post closure requirements at 310 CMR 30.580, 310 CMR 30.590, and 310 CMR 30.633.

As discussed above, the cap cross section has a permeability which is less than or equal to  $10^{-7}$  cm/sec. Geogrid reinforcement has been provided based on the results of settlement analysis testing. As shown on sheet G-6 of the Contract Drawings, the design minimum cap slope is 4%, which is within the range of 3% to 5% recommended by EPA, and well above the minimum of 2% referenced in the Massachusetts solid waste regulations. As shown on sheet G-20 of the Contract Drawings, certain run-on and run-off control swales are lined. These measures, taken together, will minimize migration of liquids through the landfill. In addition, measures to maintain the landfill in the long term, as described in the Operations and Maintenance Plan, will be implemented.

#### **2.6.2.7. Landfill standards under 310 CMR 30.633**

Section IV.H.2.c of the SOW requires that the cap be constructed in accordance with 310 CMR 30.633, including without limitation the following:

- i. Function with minimum maintenance
- ii. Promote drainage and minimize erosion or abrasion of the cap

- iii. Accommodate settling and subsidence so that the cap's integrity is maintained
- iv. Minimize the mobilization of contaminated soils and sediments and the potential for recontamination of the soils and sediments within the areas of the Un-named Stream.

As described in Section 2.3 and 2.6, the cap design, coupled with implementation of the Operations and Maintenance Plan, will meet these objectives.

**2.6.2.8. Wetlands requirements**

Section IV.H.3.a of the SOW indicates that all clearing, site grading, soil and sediment excavation, cap installation, and ancillary activities in or affecting wetlands or floodplains shall be performed in accordance with Executive Orders 11990 and 11988; 40 CFR Part 6, Appendix A; and Massachusetts Wetlands Protection Regulations, 310 CMR 10.00.

**[NEED TO COMPLETE WETLANDS RESTORATION PLAN AND SUBMIT WITH NORTH OF HATHAWAY ROAD COMPONENT OF DESIGN.]**

**2.6.2.9. Discharge of dredge or fill materials**

Section 10.H.3.b of the SOW indicates that any activities that involve the discharge of dredge or fill materials in wetlands shall be conducted in a manner utilizing the alternative which would have the least adverse impact on the aquatic ecosystem and the environment, pursuant to 40 CFR 230.10(a), and any excavated areas to be filled under this SOW shall be filled with clean materials from off-site, in accordance with 40 CFR 230.

**[NEED TO COMPLETE AFTER NORTH OF HATHAWAY ROAD SUBMITTAL.]**

**2.6.2.10. Floodplain**

Section IV.H.3.c of the SOW indicates that the cap must be constructed outside the 100-yr floodplain, in accordance with 310 CMR 30.700.

As discussed in Section 2.3, an additional culvert has been installed beneath Hathaway Road to eliminate the potential flooding condition on the Disposal Area.

#### **2.6.2.11. Disposal**

Section IV.H.4.a of the SOW indicates that, to the extent that off-site treatment or disposal is required, arrangements shall be made for off-site treatment or disposal at a disposal facility which is operating in compliance with applicable RCRA and/or TSCA requirements, in accordance with Section 121(d)(3) of CERCLA.

Off-site treatment or disposal is not anticipated to be a major component of the remedy. Specification 02228 "Soil and Debris Relocation", however, includes basic requirements for off-site treatment and disposal, should it be necessary.

#### **2.6.2.12. Air emissions**

Section IV.H.4.b of the SOW indicates that air emissions shall be monitored and shall meet the primary and secondary standards for particulate matter under the National Ambient Air Quality Standards, 40 CFR 50.6; Massachusetts Ambient Air Quality Standards, 310 CMR 6.00. The SOW also indicates that air emissions shall be monitored and shall meet the pertinent portions of MA Air Pollution Control Regulations, 310 CMR 7.00.

#### **2.6.2.13. Air emissions - OSHA**

Section IV.H.4.c of the SOW indicates that air emissions shall meet the requirements of Occupational Safety and Health Act (OSHA) Worker Safety Regulations, 29 CFR Part 1910.

The design includes the requirement that the Contractor develop a Health and Safety Plan; specification 01120 "Health and Safety Plan" includes the requirement for monitoring air emissions during construction.

#### **2.6.2.14. Discharge of treated water**

Section IV.H.4.d of the SOW indicates that any discharge of treated water (e.g., from dewatering and treatment of contaminated soils and sediments and surface drainage from controlled work areas) shall meet the substantive requirements of the Clean Water Act relating

to the National Pollutant Discharge Elimination System (NPDES); Massachusetts Surface Discharge Permit Program, 314 CMR 3.00; and Massachusetts Water Quality Standards, 314 CMR 4.00.

Specification 01150 "Construction Water Management Plan" includes requirements for management of construction water.

**2.6.2.15. Transport of hazardous waste**

Section IV.H.4.e of the SOW indicates that transport of hazardous wastes shall be in accordance with applicable RCRA and Department of Transportation (DOT) regulations at 49 CFR 171-179 and 387; and with 310 CMR 30.00.

Off-site treatment or disposal is not anticipated to be a major component of the remedy. Specification 02228 "Soil and Debris Relocation", however, includes basic requirements for off-site treatment, disposal, and transportation, should it be necessary.

**2.6.2.16. Solid debris**

Section IV.H.4.f of the SOW indicates that solid debris (e.g. cinder blocks), excluding trees and bushes, shall be decontaminated in accordance with 40 CFR 761.79 prior to off-site transport or off-site disposal.

Solid debris shall be managed on-site in accordance with specification 02228 "Soil and Debris Relocation".

**2.6.2.17. Storage and use of solvents, chemical products, and wastes**

Section IV.H.4.g of the SOW requires the design of facilities and the use of best management practices related to the storage and use of solvents and other chemical products and wastes in accordance with state and federal regulations, including Massachusetts Hazardous Waste regulations and requirements for aboveground storage tanks.

The design includes a specification for a Spill Prevention, Control, and Countermeasures Plan (01160).



**2.6.2.18. Storage of soil**

Section IV.H.4.h of the SOW indicates that soils with contaminants exceeding the PCB Soil Cleanup Standards excavated during site preparation work which are stored on-site shall be stored in accordance with state and federal regulations, including 40 CFR 761.65(b)(1)(i), (ii), and (iii), until on-site solidification.

Storage facilities shall meet, at a minimum, the following criteria:

- i. Adequate roof and walls to prevent rainwater from reaching stored materials
- ii. Adequate floor with continuous curbing
- iii. No openings that would permit liquids to flow from curbed area.

As discussed in the Explanation of Significant Differences (EPA, 1995), the extensive excavation and solidification initially included in the remedy is no longer required. Storage of soils and sediments will be much more limited in nature. Therefore, structures to house soils and sediments will not be required. Specification 02228 "Soil and Debris Relocation" includes requirements for covering stock piles of soil and debris. Specification 02226 "Sediment Excavation and Placement" includes requirements for covering stockpiles of sediments.

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### 3. Management of migration

This section addresses the requirements of Section VII.B.3 of the SOW.

#### 3.1. Active collection system

##### 3.1.1. Requirements

Section VII.B.3.a. of the SOW requires the following:

*Consistent with the Consent Decree, upon demonstrating that the ground water treatment system has attained the Ground Water Cleanup Standards at all points of compliance and upon approval by EPA, in consultation with DEP, the collection system may be shut down and Settling Defendants shall implement a three-year performance monitoring program consistent with 310 CMR 30.660 and 310 CMR 675, including 310 CMR 30.672(4), as specified in Section V.C of this SOW.*

*If, at the conclusion of the three-year performance monitoring period, Ground Water Cleanup Standards continue to be achieved, as specified in this SOW, then the Settling Defendants shall submit a report to EPA demonstrating compliance. Upon written approval by EPA, in consultation with DEP, the Settling Defendants may terminate quarterly ground water monitoring, and shall implement long-term monitoring, consistent with the Consent Decree and as described in Section VI.B of this SOW.*

##### 3.1.2. Plan to comply with requirements

The design of the active collection system includes 6 bedrock recovery wells, as shown on sheets G-7 and M-13 of the Contract Drawings, and as described in specification 02141 "Ground Water

Monitoring Well Extension and Abandonment" and specification 02142 "Ground Water Recovery Wells".

The Operations and Maintenance Plan includes discussion on operation of the bedrock recovery system.

The Post-Construction Environmental Monitoring Plan includes requirements for compliance monitoring, performance monitoring, and long term monitoring.

### 3.2. Passive collection system

#### 3.2.1. Requirements

Section VII.B.3.b of the SOW requires the following:

*Consistent with the Consent Decree, upon demonstrating that the ground water treatment system has attained the Ground Water Cleanup Standards at the point of compliance and, upon approval by EPA, in consultation with DEP, the collection system may be shut down and Settling Defendants shall implement a three-year performance monitoring program consistent with 310 CMR 30.660 and 310 CMR 675, including 310 CMR § 30.675(4), as specified in Section V.C of this SOW.*

*At the conclusion of the three-year performance monitoring period, if Ground Water Cleanup Standards continue to be achieved, as specified in this SOW, then the Settling Defendants shall submit a report to EPA demonstrating compliance. Upon written approval by EPA, in consultation with DEP, the Settling Defendants may terminate quarterly ground water monitoring, and shall implement long-term monitoring, consistent with the Consent Decree, as described in Section VI.B of this SOW.*

#### 3.2.2. Plan to comply with requirements

The design of the passive collection system includes a shallow collection trench and a pump station, as shown on sheets G-7, G-8, G-9, and M-14 of the Contract Drawings, and as described in specification 02562 "Ground Water Collection System Piping" and specification 11302 "Ground Water Collection Trench Pumps."

The Operations and Maintenance Plan includes discussion on operation of the passive collection system. The Post-Construction Environmental Monitoring Plan includes requirements for compliance monitoring, performance monitoring, and long term monitoring.

### **3.3. Ground water treatment plant**

The design of the ground water treatment plant is shown on sheets G-10, A-1 through A-3, S-1 through S-3, S-6 through S-8, M-1 through M-11, and all the sheets designated as I, E, H, P, and E.

The Operations and Maintenance Plan includes discussion on operation of the ground water treatment plant. The Post-Construction Environmental Monitoring Plan includes requirements for monitoring the ground water treatment plant.

### **3.4. Diversion and lining of the Un-Named Stream**

The Un-Named Stream east of the Disposal Area will be lined with a 72-inch prestressed concrete cylinder pipe (PCPP), as shown on sheets G-11, G-20, S-4, and S-5 of the Contract Drawings, and as described in specification 02614 "Prestressed Concrete Cylinder Pipe."

### **3.5. Attainment of performance standards**

#### **3.5.1. Requirements**

Section VII B and C of the SOW requires the following:

*Attainment of all Performance Standards described in Sections V.E and VI.C of this SOW, consistent with the Consent Decree.*

These requirements are addressed separately in Section 3.5.2 below.

### **3.5.2. Plan to comply with requirements**

#### **3.5.2.1. Operation of the ground water treatment plant**

Section V.E.1 of the SOW indicates that Settling Defendants shall operate and maintain the ground water collection, treatment and discharge system as approved by EPA, in consultation with DEP, until the Cleanup Standards are achieved consistent with the Consent Decree, as demonstrated under Section V.C.4 of the SOW.

The Operation and Maintenance Plan includes the requirement that the ground water treatment plant be operated until ground water clean-up standards are achieved. The Post-Construction Environmental Monitoring Plan includes requirements for compliance monitoring, performance monitoring, and long term monitoring.

#### **3.5.2.2. Discharge of treated ground water**

Section V.E.2 of the SOW indicates that discharge of treatment ground water shall be in accordance with the requirements of the Clean Water Act relating to the National Pollutant Discharge Elimination System (NPDES), the Massachusetts Surface Discharge Permit Program, 314 CMR 3.00, Massachusetts Water Quality Standards, 314 CMR 4.00;

Ground water will be discharged to the New Bedford POTW after treatment to pre-treatment criteria, consistent with Section X.B. of the Record of Decision and Section V.A. of the SOW. Specification 11376 "Ultra Violet Enhanced Chemical Oxidation System" includes treatment to the New Bedford POTW pretreatment criteria for organic compounds. Inorganic compounds are not anticipated to be presented in site ground water in concentrations greater than pre-treatment requirements. Requirements for discharge monitoring are presented in the Post-Construction Environmental Monitoring Plan.

#### **3.5.2.3. Hazardous waste management**

Section V.E.3 of the SOW requires that off-site shipment or transport and disposal of hazardous wastes be in accordance with applicable RCRA and Department of Transportation (DOT) Regulations: 49 CFR 171-179 and 387; and 310 CMR 30.00. Any such wastes to be sent off-site for treatment or disposal shall be sent to a disposal facility which is operating in compliance with

appropriate RCRA and/or TSCA requirements, in accordance with Section 121(d) (3) of CERCLA;

Section V.E.4 of the SOW requires compliance with applicable or relevant and appropriate portions of 40 CFR Parts 264 through 268, to the extent that Federal regulations governing hazardous wastes have been promulgated for which there is no Massachusetts counterpart under the authorize State program;

The O&M Plan includes these requirements.

#### **3.5.2.4. Air emissions**

Section V.E.5 of the SOW requires that air emissions be monitored and that air emissions shall meet the following requirements during construction and implementation, primary and secondary standards for particulate matter under the National Ambient Air Quality Standards (NAAQS) 40 CFR 50.6, and Ambient Air Quality Standards for the Commonwealth of Massachusetts 310 CMR 6.00; and the pertinent portions of MA Air Pollution Control Regulations, 310 CMR 7.00.

Specification 01130 "Perimeter Air Monitoring and Dust Control Plan" includes requirements for air monitoring during construction.

The Operations and Maintenance Plan and the Post-Construction Environmental Monitoring Plan include requirements for monitoring air emissions at the ground water treatment plant during implementation.

#### **3.5.2.5. Air emissions - OSHA**

Section V.E.6 of the SOW requires that air emissions meet the requirements of Occupational Safety and Health Act (OSHA) Worker Safety Regulations, 29 CFR Part 1910.

The design includes the requirement that the Contractor develop a Health and Safety Plan. The specification for the Health and Safety Plan (01120) includes the requirement for monitoring air emissions during construction.

#### 3.5.2.6. General requirements

Section VI.C of the SOW includes the following general requirements;

*In addition to meeting the Cleanup and Performance Standards set forth in this SOW, the Settling Defendants shall design and implement the requirements of this SOW in accordance with applicable or relevant and appropriate federal and state requirements identified in the ROD, including, but not limited to, the applicable or relevant and appropriate portions of the following:*

##### General Standards

1. *The Solid Waste Disposal Act, as amended, 42 U.S.C. § 6901 et seq., and regulations promulgated thereunder;*
2. *The federal Clean Water Act (CWA), 33 U.S.C. §1251 et seq. and regulations promulgated thereunder;*
3. *The federal Clean Air Act (CAA), 42 USC §7401 et seq. and regulations promulgated thereunder;*
4. *Federal Executive Orders 11988 (Floodplain) and 11990 (Wetlands) and 310 CMR §10.00 Wetland Protection Act;*
5. *All statutes and regulations identified by EPA and the Commonwealth as specified in Section XI. of the ROD;*
6. *Occupational Safety and Health Act, 29 CFR 1910 and 1926;*
7. *Toxic Substances Control Act, 42 U.S.C. §2601 et seq. and regulations promulgated thereunder; and*
8. *In accordance with Section 121(e) (1) of CERCLA, no federal, state or local permits shall be required for the portion of the remedial action conducted entirely on-site. The Settling Defendants shall, however, meet the substantive technical requirements and standards necessary to obtain federal and state permits for all aspects of the remedial action.*

These general requirements will be met during construction and implementation, as applicable or relevant and appropriate.

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#### 4. Institutional controls

Section VII.13.4 of the SOW requires the following:

*Settling Defendants shall conduct yearly reviews to monitor the implementation of the institutional controls specified in Section VII.A. of this SOW.*

The Operations and Maintenance Plan includes this requirement.



## Appendix A



**O'BRIEN & GERE**  
ENGINEERS, INC.

#### 40 CFR 761.75 Chemical waste landfills.

This section applies to facilities used to dispose of PCBs in accordance with the part.

[49 FR 28172, July 10, 1984]

(a) *General.* A chemical waste landfill used for the disposal of PCBs and PCB Items shall be approved by the Agency Regional Administrator pursuant to paragraph (c) of this section. The landfill shall meet all of the requirements specified in paragraph (b) of this section, unless a waiver from these requirements is obtained pursuant to paragraph (c)(4) of this section. In addition, the landfill shall meet any other requirements that may be prescribed pursuant to paragraph (c)(3) of this section.

(b) *Technical requirements.* Requirements for chemical waste landfills used for the disposal of PCBs and PCB Items are as follows:

(1) *Soils.* The landfill site shall be located in thick, relatively impermeable formations such as large-area clay pans. Where this is not possible, the soil shall have a high clay and silt content with the following parameters:

- (i) In-place soil thickness, 4 feet or compacted soil liner thickness, 3 feet;
- (ii) Permeability (cm/sec), equal to or less than  $1 \cdot 10^{-7}$ ;
- (iii) Percent soil passing No. 200 Sieve,  $>30$ ;
- (iv) Liquid Limit,  $>30$ ; and
- (v) Plasticity Index  $>15$ .

(2) *Synthetic membrane liners.* Synthetic membrane liners shall be used when, in the judgment of the Regional Administrator, the hydrologic or geologic conditions at the landfill require such a liner in order to provide at least a permeability equivalent to the soils in paragraph (b)(1) of this section. Whenever a synthetic liner is used at a landfill site, special precautions shall be taken to insure that its integrity is maintained and that it is chemically compatible with PCBs. Adequate soil underlining and soil cover shall be provided to prevent excessive stress on the liner and to prevent rupture of the liner. The liner must have a minimum thickness of 30 mils.

(3) *Hydrologic conditions.* The bottom of the landfill shall be above the historical high groundwater table as provided below. Floodplains, shorelands, and groundwater recharge areas shall be avoided. There shall be no hydraulic connection between the site and standing or flowing surface water. The site shall have monitoring wells and leachate collection. The bottom of the landfill liner system or natural in-place soil barrier shall be at least fifty feet from the historical high water table.

(4) *Flood protection.*

(i) If the landfill site is below the 100- year floodwater elevation, the operator shall provide surface water diversion dikes around the perimeter of the landfill site with a minimum height equal to two feet above the 100-year floodwater elevation.

(ii) If the landfill site is above the 100- year floodwater elevation, the operators shall provide diversion structures capable of diverting all of the surface water runoff from a 24-hour, 25-year storm.

(5) *Topography.* The landfill site shall be located in an area of low to moderate relief to minimize erosion and to help prevent landslides or slumping.

(6) *Monitoring systems—*

(i) *Water sampling.*

(A) For all sites receiving PCBs, the ground and surface water from the disposal site area shall be sampled prior to commencing operations under an approval provided in paragraph (c) of this section for use as baseline data.

(B) Any surface watercourse designated by the Regional Administrator using the authority provided in paragraph (c)(3)(ii) of this section shall be sampled at least monthly when the landfill is being used for disposal operations.

(C) Any surface watercourse designated by the Regional Administrator using the authority provided in paragraph (c)(3)(ii) of this section shall be sampled for a time period specified by the Regional Administrator on a frequency of no less than once every six months after final closure of the disposal area.

(ii) *Groundwater monitor wells.*

(A) If underlying earth materials are homogenous, impermeable, and uniformly sloping in one direction, only three sampling points shall be necessary. These three points shall be equally spaced on a line through the center of the disposal area and extending from the area of highest water table elevation to the area of the lowest water table elevation on the property.

(B) All monitor wells shall be cased and the annular space between the monitor zone (zone of saturation) and the surface shall be completely backfilled with Portland cement or an equivalent material and plugged with Portland cement to effectively prevent percolation of surface water into the well bore. The well opening at the surface shall have a removable cap to provide access and to prevent entrance of rainfall or stormwater runoff. The well shall be pumped to remove the volume of liquid initially contained in the well before obtaining a sample for analysis. The discharge shall be treated to meet applicable State or Federal discharge standards or recycled to the chemical waste landfill.

(iii) *Water analysis.* As a minimum, all samples shall be analyzed for the following parameters,

and all data and records of the sampling and analysis shall be maintained as required in § 761.80(d)(1). Sampling methods and analytical procedures for these parameters shall comply with those specified in 40 CFR Part 136 as amended in 41 FR 52779 on December 1, 1976.

[53 FR 12524, April 15, 1988]

(A) PCBs.

(B) pH.

(C) Specific conductance.

(D) Chlorinated organics.

(7) *Leachate collection.* A leachate collection monitoring system shall be installed above the chemical waste landfill. Leachate collection systems shall be monitored monthly for quantity and physicochemical characteristics of leachate produced. The leachate should be either treated to acceptable limits for discharge in accordance with a State or Federal permit or disposed of by another State or Federally approved method. Water analysis shall be conducted as provided in paragraph (b)(6)(iii) of this section. Acceptable leachate monitoring/collection systems shall be any of the following designs, unless a waiver is obtained pursuant to paragraph (c)(4) of this section.

(i) *Simple leachate collection.* This system consists of a gravity flow drainfield installed above the waste disposal facility liner. This design is recommended for use when semi-solid or leachable solid wastes are placed in a lined pit excavated into a relatively thick, unsaturated, homogenous layer of low permeability soil.

(ii) *Compound leachate collection.* This system consists of a gravity flow drainfield installed above the waste disposal facility liner and above a secondary installed liner. This design is recommended for use when semi-liquid or leachable solid wastes are placed in a lined pit excavated into relatively permeable soil.

(iii) *Suction lysimeters.* This system consists of a network of porous ceramic cups connected by hoses/tubing to a vacuum pump. The porous ceramic cups or suction lysimeters are installed along the sides and under the bottom of the waste disposal facility liner. This type of system works best when installed in a relatively permeable unsaturated soil immediately adjacent to the bottom and/or sides of the disposal facility.

(8) *Chemical waste landfill operations.*

(i) PCBs and PCB Items shall be placed in a landfill in a manner that will prevent damage to containers or articles. Other wastes placed in the landfill that are not chemically compatible with PCBs and PCB Items including organic solvents shall be segregated from the PCBs throughout the waste handling and disposal process.

(ii) An operation plan shall be developed and submitted to the Regional Administrator for approval as required in paragraph (c) of this section. This plan shall include detailed explanations of the procedures to be used for recordkeeping, surface water handling procedures, excavation and backfilling, waste segregation burial coordinates, vehicle and equipment movement, use of roadways, leachate collection systems, sampling and monitoring procedures, monitoring wells, environmental emergency contingency plans, and security measures to protect against vandalism and unauthorized waste placements. EPA guidelines entitled "Thermal Processing and Land Disposal of Solid Waste" (39 FR 29337, Aug. 14, 1974) are a useful reference in preparation of this plan. If the facility is to be used to dispose of liquid wastes containing between 50 ppm and 500 ppm PCB, the operations plan must include procedures to determine that liquid PCBs to be disposed of at the landfill do not exceed 500 ppm PCB and measures to prevent the migration of PCBs from the landfill. Bulk liquids not exceeding 500 ppm PCBs may be disposed of provided such waste is pretreated and/or stabilized (e.g., chemically fixed, evaporated, mixed with dry inert absorbant) to reduce its liquid content or increase its solid content so that a non-flowing consistency is achieved to eliminate the presence of free liquids prior to final disposal in a landfill. PCB Container of liquid PCBs with a concentration between 50 and 500 ppm PCB may be disposed of if each container is surrounded by an amount of inert sorbent material capable of absorbing all of the liquid contents of the container.

(iii) Ignitable wastes shall not be disposed of in chemical waste landfills. Liquid ignitable wastes are wastes that have a flash point less than 60 degrees C (140 degrees F) as determined by the following method or an equivalent method: Flash point of liquids shall be determined by a Pensky-Martens Closed Cup Tester, using the protocol specified in ASTM Standard D 93-90, or the Setaflash Closed Tester using the protocol specified in ASTM Standard D 3278-89.

[48 FR 5729, Feb. 8, 1983; 53 FR 21641, June 9, 1988; 57 FR 13323, April 16, 1992]

(iv) Records shall be maintained for all PCB disposal operations and shall include information on the PCB concentration in liquid wastes and the three dimensional burial coordinates for PCBs and PCB Items. Additional records shall be developed and maintained as required in § 761.80.

[53 FR 12524, April 15, 1988]

*(9) Supporting facilities.*

(i) A six foot woven mesh fence, wall, or similar device shall be placed around the site to prevent unauthorized persons and animals from entering.

(ii) Roads shall be maintained to and within the site which are adequate to support the operation and maintenance of the site without causing safety or nuisance problems or hazardous conditions.

(iii) The site shall be operated and maintained in a manner to prevent safety problems or hazardous conditions resulting from spilled liquids and windblown materials.

post-closure care of an impoundment subject to 310 CMR 30.617(5) shall include the cost of complying with the expected closure plan, the contingent closure plan, and the contingent post-closure plan. Where the costs of the expected closure plan and the contingent closure plan overlap (i.e., the same items are factored into the cost estimate), the costs need not be counted twice.

### **30.618: Stand-by Surface Impoundments - Waiver From Groundwater Monitoring Requirements**

(1) On a case-by-case basis, the Department may waive all or part of 310 CMR 30.660: Groundwater Protection for surface impoundments that are designed and operated solely for the containment of hazardous waste in the event of an emergency at the facility (e.g., equipment failure or overflows). If such a waiver is granted, the owner or operator shall:

(a) Immediately notify the Department by the quickest available means following an emergency which requires that the impoundment be utilized, and follows this up with a written notification within seven days; and

(b) Remove all waste from the impoundment as expeditiously as practicable and in a manner and time period approved by the Department.

(2) If the owner or operator fails to comply with 310 CMR 30.618(1)(a) or (b), the Department may require that the owner or operator comply with 310 CMR 30.660: Groundwater Protection.

(3) Nothing in 310 CMR 30.618 relieves the owner or operator from the responsibility to comply with any other provision of 310 CMR 30.610.

### **30.620: Landfills**

#### **30.621: Applicability**

310 CMR 30.621 through 30.633, cited collectively as 310 CMR 30.620, prescribe requirements which apply to owners and operators of facilities that dispose of hazardous waste in landfills.

#### **30.622: Design And Operating Requirements**

(1) Each landfill shall be underlain by two liners which are designed and constructed in a manner that prevents the migration of liquids into or out of the space between the liners. The liners shall be designed, constructed and installed to prevent any migration of wastes out of the landfill to the adjacent groundwater, surface water or subsurface soil at any time during the active life and during the closure period of the landfill. The upper liner shall be constructed of materials that prevent waste from passing into the liner during the active life of the facility. Clay liners and

admixes shall not be acceptable. The bottom liner may be constructed of materials that allow waste to migrate into the liner itself but not into the groundwater, surface water or adjacent subsurface soil during the active life of the facility. The bottom liner shall have a hydraulic conductivity not to exceed  $1 \times 10^{-7}$  cm/sec. Each liner shall be:

(a) Constructed of materials that have appropriate chemical properties and sufficient strength and thickness to prevent failure due to:

1. pressure gradients including static head and external hydrogeologic forces;
2. physical contact with and the chemical properties of the waste or leachate to which it is exposed;
3. climatic conditions;
4. exposure to ozone, ultraviolet light or microbes; and
5. the stress of installation and the stress of daily operation, including the use of machinery and equipment upon the liner after installation.

(b) Placed upon a foundation or base capable of providing support to the liner and resistance to pressure gradients above and below the liner to prevent failure of the liner due to settlement, compression or uplift; rocks, boulders, irregularities with sharp edges, and all material that may damage the liner shall be removed from the subgrade prior to installation of the liner; and

(c) Installed to cover all surrounding earth likely to be in contact with the waste or leachate.

(2) The bottom liner shall be at least four (4) feet above the probable high groundwater level as determined pursuant to 310 CMR 30.675. This shall not prohibit the owner or operator from installing passive systems designed to artificially lower the groundwater table throughout the operating life of the facility and beyond, provided that the facility's license specifically authorizes this.

(3) A leak detection, collection and removal system shall be designed, constructed, maintained and operated between the liners to detect, collect and remove all discharge of liquid into the space between the liners. The detection, collection and removal system shall be designed, constructed, operated and maintained so that leakage flows freely from the collection system and is removed either as it accumulates or with sufficient frequency to prevent backwater within the collection system. If liquid leaks into the leak detection, collection and removal system, the owner or operator shall:

(a) Notify the Department of the leak immediately by the quickest available means and also notify the Department in writing within 7 days; and

(b) Either:

1. Within the period of time which shall be specified by the Department:

a. Remove accumulated liquid;

b. To prevent the migration of liquids through the liner, repair or replace the liner which is leaking; and

c. Obtain a certification from an independent Massachusetts registered professional engineer that, to the best of his knowledge and opinion, the leak has been stopped; or

2. Ask the Department to determine that it is impractical to repair or replace the liner that is leaking, in which case the Department may authorize the owner or operator to continue operating the landfill but only if leakage is continually removed by the leakage detection, collection and removal system and 310 CMR 30.660 (Groundwater Protection) is complied with. In making such a determination, the Department may consider the following:

a. The type(s) and volume(s) of waste(s) in the landfill;

b. The ease with which the cause of the leak can be determined;

c. Safety hazards involved in removing hazardous waste from the landfill;

d. Availability of temporary storage areas for waste removed from the landfill; and

e. The types and concentrations of hazardous constituents appearing in the liquid which is leaking from the liner.

(4) The landfill shall have, immediately above the upper liner, a leachate collection and removal system that is designed, constructed, maintained, and operated to collect and remove leachate from the landfill. The leachate depth over the liner at any point over the base of the landfill shall not exceed 30 cm. (one foot). If the collected leachate is hazardous waste pursuant to 310 CMR 30.100, it shall be managed as hazardous waste in compliance with 310 CMR 30.000. If the collected leachate is discharged to surface water or groundwater, such discharge is subject to M.G.L. c. 21, s. 43. The leachate collection and removal system shall be:

(a) Constructed of materials that are:

1. Chemically resistant to the waste managed in the landfill and to the leachate expected to be generated; and

2. Of sufficient strength and thickness to prevent collapse under the pressures exerted by overlying waste, waste cover material, and by any equipment used at the landfill; and

(b) Designed and operated to function without clogging through the active life and the closure and post-closure period of the landfill.



(5) The owner or operator shall design, construct, operate and maintain a run-on control system capable of preventing flow onto the active portion of the landfill during peak discharge from at least a 100-year storm.

(6) The owner or operator shall design, construct, operate and maintain a run-off management system to collect and control at least the water volume resulting from a 24-hour, 100-year storm. If the collected run-off is hazardous waste pursuant to 310 CMR 30.100, it shall be managed as hazardous waste in compliance with 310 CMR 30.000. If the collected run-off is discharged to surface water or groundwater, such discharge is subject to M.G.L. c. 21, s. 43.

(7) To maintain design capacity of the system, collection and holding facilities (e.g., tanks, basins) associated with run-on and run-off control systems shall be emptied or otherwise managed expeditiously after storms.

(8) If a landfill contains any particulate matter which may be subject to wind dispersal, the owner or operator shall cover or otherwise manage the landfill to control wind dispersal.

(9) The owner or operator shall design and operate the facility so that, where necessary to protect public health, safety and welfare and the environment, the migration of toxic, ignitable or otherwise harmful emissions from the facility site shall be controlled.

(10) The owner or operator shall provide, and maintain in good repair, access roads at the landfill site. Such access roads shall be designed, constructed and maintained so that traffic will flow smoothly at all times and will not be interrupted by inclement weather.

(11) Landfills shall be equipped with suitable channeling devices, such as ditches, berms or settling basins, to prevent run-off originating from the landfill site which could cause interference with natural drainage of adjacent land(s).

### **30.623: Demonstration Of Waste/Liner Compatibility**

Submitted with the license application shall be a demonstration that the waste(s) and leachate that may be in contact with the liners are compatible with the liner materials to be used. The license applicant shall persuade the Department that the wastes will not cause any detrimental effect (e.g., cause cracks, swelling, decrease in mechanical strength, change in chemical properties or increase in permeability) on the liner material(s) used to prevent leakage into or out of the space between the liners. This demonstration shall be made by:

(1) conducting field tests or laboratory tests which are approved by the Department; all such testing shall be fully documented and submitted with the license application; or

(2) submitting to the Department historical data which documents successful use of the particular liner material to be used with the waste(s) and leachate to which the liner materials will

be exposed; or

(3) submitting to the Department scientific and technical literature which demonstrates that the waste(s) and leachate will not adversely affect the liners.

### **30.624: Monitoring And Inspection**

(1) During construction and installation, liners and cover systems (e.g., membranes, sheets and coatings) shall be inspected for uniformity, damage, and imperfections (e.g., holes, cracks, thin spots, or foreign materials). Immediately after construction and installation, each synthetic liner and cover shall be inspected, using methods acceptable to the Department, to ensure tight seams and joints and the absence of tears, punctures or blisters. Immediately after construction and installation, each soil-based and admixed liner and cover shall be inspected for imperfections, including lenses, cracks, channels, root holes, or other structural defects, that might cause an increase in the permeability of the liner or cover.

(2) After a liner has been installed and prior to introducing hazardous waste into the landfill, the owner or operator shall obtain from an independent Massachusetts registered professional engineer a certification which states that:

(a) The liner has been inspected in accordance with 310 CMR 30.624(1); and

(b) Each defect found has been properly repaired.

(3) While a landfill is in operation, it shall be inspected weekly and also immediately after storms to detect evidence of any of the following:

(a) Deterioration, malfunction, or improper operation of run-on and run-off control systems;

(b) The presence of liquids in leak detection, collection and removal systems installed to comply with 310 CMR 30.622(3);

(c) Proper functioning of wind dispersal control systems, where present;

(d) The presence of leachate in leachate collection and removal systems; and

(e) Proper functioning of leachate collection and removal systems.

(4) All inspections done pursuant to 310 CMR 30.624(3) shall be recorded in the log required pursuant to 310 CMR 30.515(1).

### **30.625. Supervision Of Operation**

(1) During the period beginning with commencement of construction of each hazardous waste landfill and ending two years thereafter, there shall be in effect at all times a contract properly executed by the owner or operator and by an independent Massachusetts registered professional

engineer knowledgeable in matters of hazardous waste disposal. The owner or operator shall submit a copy of said contract to the Department with the license application. The contract shall provide for the following minimum requirements:

(a) During site preparation, the engineer shall provide sufficient supervision, assistance and inspection to enable him to certify that preparation of the site has been done in accordance with the plans which were approved by the Department.

(b) During the operation of the landfill,

1. The engineer shall provide daily supervision, engineering assistance, and plan interpretation during the first week of operation.

2. The engineer shall conduct monthly inspections during the first year of operation to ensure compliance with the approved plans.

3. Thereafter, the engineer shall conduct inspections of the landfill operation at least once every two (2) months.

(c) The engineer shall comply with 310 CMR 30.625(3) and (4).

(2) After expiration of the period specified in 310 CMR 30.625(1), there shall be in effect at all times a contract properly executed by the owner or operator and by an independent Massachusetts registered professional engineer knowledgeable in matters of hazardous waste disposal. The owner or operator shall submit to the Department a copy of each such contract. Each such contract shall provide for the following minimum requirements:

(a) The engineer shall conduct inspections at least once every two (2) months; and

(b) The engineer shall comply with 310 CMR 30.625(3) and (4).

(3) After each site inspection, the engineer shall prepare a written report for the owner or operator. This report shall be part of the facility's operating record and shall be kept in compliance with 310 CMR 30.541 through 30.543. The engineer shall also submit a copy of this report to the Department within fifteen (15) days of the inspection.

(4) The engineer shall promptly notify the Department of any and all deviations from the approved plans and operating procedure.

### **30.626. Surveying And Record Keeping**

The owner or operator of a hazardous waste landfill shall maintain the following items in the operating record required pursuant to 310 CMR 30.542:

(1) On a map, the exact location and dimensions, including depth, of each cell with respect to permanently surveyed benchmarks; and

- (2) The contents of each cell and the approximate location of each waste type within each cell.

**30.627: Equipment**

(1) The owner or operator shall provide equipment in adequate numbers and of appropriate type and size for the proper operation of the landfill in accordance with good engineering practice and in compliance with 310 CMR 30.000:

(2) The owner or operator shall make provisions for the routine maintenance of equipment and to assure satisfactory performance capability for the various operations necessary for excavation, compaction, transportation, covering and other aspects of a landfill, and for the prompt repair or replacement of said equipment.

(3) The owner or operator shall provide at the site suitable shelter or protection for all equipment and service supplies used in connection with landfill operation.

(4) The owner or operator shall make arrangements for providing standby equipment in the event of breakdown of regular equipment. Such standby equipment shall be available for use and shall be provided within twenty-four (24) hours of such breakdown; otherwise the landfill area shall be closed for receipt of waste until equipment becomes available.

**30.628: Special Requirements For Ignitable, Reactive, And Incompatible Hazardous Wastes, And Hazardous Wastes That Are Polyhalogenated Aromatic Hydrocarbons**

(1) Ignitable or reactive hazardous waste shall not be disposed of in a landfill.

(2) Incompatible hazardous wastes, or materials incompatible with hazardous wastes (see 310 CMR 30.561 for examples) shall not be placed in the same landfill cell unless 310 CMR 30.560(3) is complied with.

(3) Polyhalogenated aromatic hydrocarbons shall not be placed in a landfill except in accordance with all other applicable provisions of 310 CMR 30.620 and in accordance with the terms and conditions of a management plan, approved by the Department, for such placement. Compliance with such a plan, when approved, shall be a condition of a license issued pursuant to 310 CMR 30.000. The Department may approve a management plan for the placement of polyhalogenated aromatic hydrocarbons in a landfill only if, after considering at least the following criteria, the Department determines that such approval is in accordance with provisions set forth in 310 CMR 30.810 through 30.814.

(a) The volume and physical and chemical characteristics of the polyhalogenated aromatic hydrocarbons, including their potential to migrate through the soil or to volatilize or escape into the atmosphere.

(b) The volume and physical and chemical characteristics of the other materials placed into the

landfill, including their potential to migrate through the soil or to volatilize or escape into the atmosphere.

(c) The attenuative properties of the soil and other materials surrounding or underlying the landfill.

(d) The effectiveness of additional treatment, design, or monitoring techniques used by the owner or operator of the landfill. The Department may require the use of additional or different treatment, design, or monitoring techniques to reduce the possibility of migration or emission of these materials into ground water, surface water, soil, or air.

### **30.629: Special Requirements For Liquid Waste**

(1) Non-containerized liquid waste or waste containing free liquids, in each case as determined in accordance with 310 CMR 30.156, shall not be placed in a landfill.

(2) A container holding liquid waste or waste containing free liquids, in each case as determined in accordance with 310 CMR 30.156, shall not be placed in a landfill.

(3) For purposes of 310 CMR 30.629.

(a) Wastes containing less than 20% solids by weight shall be considered liquids.

(b) Wastes which contain greater than 20% solids by weight shall be considered to contain free liquid if a 100 ml representative sample of such waste cannot be completely retained in a standard 400 micron conical paint filter for five (5) minutes without loss of any portion of the waste from the bottom of the filter. This test shall be performed at approximately 65 F. Alternate testing procedures may be used if approved by the Department.

(4) The owner or operator of a landfill shall include in the waste analysis plan required pursuant to 310 CMR 30.513 provisions for testing wastes to ensure that they do not contain free liquids.

### **30.630: Special Requirements For Containers**

(1) An empty container shall be crushed flat, shredded, or similarly reduced in volume to the maximum practical extent or filled with solids before it is buried beneath the surface of a landfill.

(2) A partially empty container, before it is buried beneath the surface of a landfill, shall be:

(a) Filled with solids compatible with the wastes already in the container; or

(b) Crushed to the maximum practical extent to eliminate void spaces; or

(c) Emptied and the empty container crushed flat, or similarly reduced in volume.

(3) To be considered "filled with solids" in compliance with 310 CMR 30.630(1) or (2)(a), a container shall be filled in compliance with 310 CMR 30.630(3)(a) or (b), whichever results in less void space.

(a) The container shall be filled to within 7.6 centimeters (3 inches) of the top of the container, or

(b) The content of the container shall occupy 90% or more of the volume of the container.

(4) For the purposes of 310 CMR 30.630, the term "partially empty container" shall mean a container that is neither an empty container (see 310 CMR 30.010) or a container that is "filled with solids" [See 310 CMR 30.630(3)].

(5) Landfill disposal of containers of hazardous waste in other containers (e.g., lab packs) is prohibited.

**30.631: Wastes Unacceptable For Landfilling**

(1) Except as provided in 310 CMR 30.631(3), (4) or (5), the following wastes shall not be disposed of in a landfill:

(a) Any sludge or solid containing halogenated organic compounds in a concentration greater than 100 mg/kg;

(b) Any waste containing cyanide;

(c) Any waste which is acutely hazardous waste pursuant to 310 CMR 30.136.

(2) The Department may prohibit the disposal of any hazardous waste in a landfill if it determines that landfilling of such waste may present a hazard to public health, safety or welfare or the environment (e.g., volatile organics).

(3) On a case-by case basis, the Department may waive any provision of 310 CMR 30.631(1) if the Department determines that:

(a) The waste cannot be recycled, treated or disposed of by some other means in compliance with 310 CMR 30.000; and

(b) The type and volume of waste to be disposed of will not present any significant risk to public health, safety or welfare or the environment.

(4) On a case-by-case basis, the Department may waive any provision of 310 CMR 30.631(1) if the waste is a contaminated soil and the Department determines that the requirements set forth in 310 CMR 30.631(3)(a) and (b) are met.

(5) On a case-by-case basis, the Department may waive any provision of 310 CMR 30.631(1) if the waste has been absorbed by spill clean-up material and the Department determines that the requirements set forth in 310 CMR 30.631(3)(a) and (b) are met.

(6) The Department shall review the feasibility of available hazardous waste management alternatives for all hazardous wastes which the owner or operator proposes to dispose of at the landfill, as stated in the license application pursuant to 310 CMR 30.804(19)(a). The Department shall approve for landfill disposal only those hazardous wastes which cannot be reused, recycled, treated or disposed of by some other means in compliance with 310 CMR 30.000, or which the Department determines cannot be eliminated.

### **30.632: Stabilization Solidification Plan**

(1) The owner or operator shall prepare a stabilization/solidification plan designed to ensure that all wastes disposed of in the landfill have been treated to the maximum extent practicable to minimize the potential for wastes migrating from the landfill site. At a minimum, the stabilization/solidification plan shall include:

- (a) The wastes which will be stabilized and/or solidified at the landfill site prior to disposal;
- (b) The techniques which will be used to limit the solubility and potential for migration of the waste by:
  - 1. The addition of materials that ensure that hazardous constituents are maintained in their least soluble form;
  - 2. The production of monolithic blocks of treated waste with high structural integrity; and/or
  - 3. The placing of a jacket or second layer of material of low permeability and low chemical reactivity between the waste and the landfill;
- (c) The means that will be used to ensure that wastes which will not be stabilized or solidified at the landfill site will, to the maximum extent practicable, be stabilized or solidified at the site of generation of the waste, or at another facility where such stabilization or solidification can be lawfully done, if the landfill is not at the site of generation of the waste;
- (d) A description of the physical and chemical properties of the stabilized/solidified waste (e.g., compressive strength, leachability); and
- (e) A quality assurance program designed to ensure that the stabilized/solidified waste meets the specifications which are outlined in the stabilization/solidification plan.

(2) The stabilization/solidification plan shall be submitted to the Department with the license application and upon approval by the Department shall become a condition of the license.

**30.633: Closure And Post-Closure Care**

(1) At final closure of the landfill or upon closure of any cell, the owner or operator shall cover the landfill or cell with a final cover designed and constructed to:

- (a) Provide long-term minimization of migration of liquids through the closed landfill;
- (b) Function with minimum maintenance;
- (c) Promote drainage and minimize erosion or abrasion of the cover;
- (d) Accommodate settling and subsidence so that the cover's integrity is maintained; and
- (e) Have a permeability less than or equal to the permeability of the bottom liner system.

(2) (Effective on and after July 1, 1988) After final closure of the landfill or upon closure of any cell, the owner or operator shall comply with all post-closure requirements set forth in 310 CMR 30.590, including, without limitation, maintenance and monitoring throughout the post-closure care period as specified pursuant to 310 CMR 30.592. The owner or operator shall:

- (a) Maintain the integrity and effectiveness of the final cover, including making repairs to the cap to correct the effects of settling, subsidence, erosion or other events;
- (b) Maintain and monitor the leak detection, collection and removal system in compliance with 310 CMR 30.622(3);
- (c) Continue to operate the leachate collection and removal system;
- (d) Maintain and monitor the groundwater monitoring system and comply with all other applicable requirements of 310 CMR 30.660;
- (e) Prevent run-off and run-on from eroding or otherwise damaging the final cover;
- (f) Maintain access roads in compliance with 310 CMR 30.622(10);
- (g) Maintain gas collection and control systems, where present; and
- (h) Protect and maintain surveyed benchmarks used in complying with 310 CMR 30.626.

(3) During the post-closure period, if liquid leaks into the leak detection, collection and removal system, the owner or operator shall comply with the provisions of 310 CMR 30.622(3).

**30.634 - 30.639: [Reserved]**

**30.640: Waste Piles**

(1) 310 CMR 30.640 through 30.649 prescribe requirements which apply to owners and





## ARAR Review

## June 1996



**O'BRIEN & GERE**  
ENGINEERS, INC.

**REPORT**

# **ARAR Review**

**Sullivan's Ledge Superfund Site  
New Bedford, Massachusetts**

**June 1996**

ARAR Review OU-1 Sullivan's Ledge Superfund Site			
Requirement	Synopsis from Table 3 of ROD	Applicability to design	How/ where ARARs attained in design

Safe Drinking Water Act Regulations, 40 CFR Part 141, Subpart B	Establishes MCLs for public water supplies. These relevant and appropriate regulations will be waived because of technical impracticability.	<b>Not applicable to design.</b> 40 CFR Part 141, Subpart B, waived in Section XI.B. of ROD.	<b>Not Applicable</b>
TSCA PCB Disposal Requirements, 40 CFR 761.60	Disposal of soils and sediments with PCBs over 50 ppm, must be by incinerator or equivalent alternative method, or chemical waste landfill. Remedy will result in chemical waste landfill containing existing wastes which have been previously landfilled on site and solidified soils and sediments. Some requirements of chemical waste landfill which are not necessary to protect against risk of injury to health or environment will be waived under the waiver provisions of the TSCA regulations.	<b>Applicable to design.</b> 40 CFR 761.75(b)(4-9) applicable to design. 40 CFR 761.75 (b) (1,2,3) waived in Section XI.B. of ROD.	<b>See Attachment A</b>

ARAR Review OU-1 Sullivan's Ledge Superfund Site			
Requirement	Synopsis from Table 3 of ROD	Applicability to design	How/ where ARARs attained in design

RCRA Land Disposal Regulations, 40 CFR 268 Subpart C	These regulations are not applicable because solidified soils are not expected to contain characteristic or listed hazardous waste.	<b>Not applicable to design.</b> <i>Based on pre-design studies, floodplain soil and off-site soil and sediments, that are representative of material that may be excavated, did not exhibit the toxicity characteristics and will not constitute hazardous waste. (EPA letter to G. Gifford dated 3/21/95)</i>	<b>Not Applicable</b>
RCRA Minimum Technology Regulations 40 CFR 264.300	These regulations establish standards for new or replacements landfills, or lateral expansions of landfills, including double liner and leachate collection. Not applicable because remedy does not involve creation or replacement of landfill, or lateral expansion of landfill. Double liners are not relevant and appropriate because it is technically infeasible to construct a double liner separating wastes in quarry pits from the groundwater. Remedy will comply with leachate collection requirements, except inappropriate length of operation requirements.	<b>Not applicable to design.</b> 40 CFR 264.300 waived in Section XI.B. of ROD.	<b>Not Applicable</b>

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Surface Water Discharge Regulations, 40 CFR 122, promulgated pursuant to Clean Water Act	Applicable to discharge of groundwater treatment system effluent. If effluent is discharged to surface waters, regulations will be attained through compliance with state water quality standards and monitoring of discharge.	<b>Not applicable to design of ground water treatment plant.</b> <i>Effluent from the groundwater treatment plant will be discharged to the POTW.</i>	<b>Not Applicable to ground water treatment plant effluent.</b>
Surface Water Discharge Regulations, 40 CFR 122, promulgated pursuant to Clean Water Act	Applicable to discharge of groundwater treatment system effluent. If effluent is discharged to surface waters, regulations will be attained through compliance with state water quality standards and monitoring of discharge.	<b>Possibly applicable to treatment of construction water.</b>	<i>If construction water is discharged to unnamed stream, water will be treated to meet this regulation (see specification 01150).</i>
Pretreatment Regulations for Indirect Discharges to POTWs, 40 CFR Part 403	These regulations control the discharge of pollutants into POTWs, including specific and general prohibitions. If groundwater from passive collection system is discharged to sewer after New Bedford secondary treatment plant becomes operational, these regulations will be applicable, and the remedy will comply through pretreatment.	<b>Applicable to design.</b> <i>These regulations will be applicable to the design because groundwater from passive and active collection systems will be discharged to sewer after New Bedford secondary treatment plant becomes operational.</i>	Pre-treatment is being provided to meet the requirements of the City of New Bedford letter dated June 30, 1994. (See specification 11376.)

ARAR Review OU-1 Sullivan's Ledge Superfund Site			
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Discharge of Dredged and Fill Materials Regulations, 40 CFR 230, promulgated under Section 404 of Clean Water Act	This regulation applies to the use of fill material in stream and wetlands. Remedy will comply because there is no practicable alternative having a less adverse impacts, and steps will be taken to minimize adverse impacts, such as sedimentation basins, baffles and stream and wetlands restoration.	<b>Applicable to design.</b> <i>It will be necessary to address adverse impacts and steps to be taken to address adverse impacts.</i>	Wetlands restoration plan will be provided with OU-1 design for remediation north of Hathaway Road, after review by OU-2.
National Ambient Air Quality Standards (NAAQS), 40 CFR 50.6, promulgated pursuant to Clean Air Act	These applicable regulations set primary and secondary 24 hour concentrations for emissions of particulate matter. Fugitive dust from excavation, treatment, solidification and disposal will be maintained below these standards by dust suppressants if necessary.	<b>Applicable to design.</b> <i>It will be necessary that fugitive dust from excavation, dewatering, and disposal be maintained below NAAQS.</i>	The design includes requirements for perimeter air monitoring (See specification 01130).
OSHA Worker Safety Regulations, 29 CFR Part 1910	These applicable regulations contain safety and health standards that will be met during all remedial activities, including construction of the cap and installation of ground water wells.	<b>Applicable to design.</b> <i>These applicable regulations contain safety and health standards. It will be necessary that these standards be met during all remedial activities, including construction of the cap and installation of ground water wells.</i>	The design includes the requirement that the contractor develop and implement a Health & Safety Plan (See specification 01120).



ARAR Review OU-1 Sullivan's Ledge Superfund Site			
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Department of Transportation Regulations for Transport of Hazardous Materials, 49 CFR Parts 107, 171.1-172.558	Requirements for transporting hazardous materials off-site will be met.	<b>Applicable to design.</b> <i>It will be necessary that the requirements for transporting hazardous materials off-site be met, including any solids extracted during the groundwater treatment program.</i>	It will be necessary that treatment plant operations be in compliance with this requirement, if treatment plant solids are hazardous (See O&M Plan).
Massachusetts Drinking Water Regulations, 310 CMR 22	Establishes maximum contaminant levels for public drinking water supplies. Attainment of this relevant and appropriate regulation will be waived because of technical impracticability.	<b>Not applicable to design.</b> <i>310 CMR 22 waived in Section XI.B. of ROD.</i>	<b>Not Applicable.</b>
Massachusetts Ground Water Standards, 314 CMR 6	Establishes minimum ground water criteria. Attainment of this relevant and appropriate regulation will be waived because of technical impracticability.	<b>Not applicable to design.</b> <i>314 CMR 6 waived in Section XI.B. of ROD.</i>	<b>Not Applicable.</b>
Massachusetts Hazardous Waste Closure and Post Closure Regulations, 310 CMR 30.580 and 30.590	The closure and post closure regulations are relevant and appropriate. The cap will be constructed and maintained and monitoring will be performed in compliance with these requirements.	<b>Applicable to design.</b> <i>The cap must be constructed, maintained and monitored in compliance with these requirements for closure and post closure.</i>	Closure and post closure issues are addressed in the Operations and Maintenance Plan and the Implementation Plan



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Massachusetts Hazardous Waste Location Regulations, 310 CMR 30.700	The cap will be constructed outside the 100-year floodplain in accordance with these relevant and appropriate regulations.	<b>Applicable to design.</b> <i>The cap must be constructed outside the 100-year floodplain in accordance with these regulations.</i>	The culverts beneath Hathaway Road are being augmented to carry the potential flood from the 100-yr storm away from the cap. (See drawings G-11, G-20, S-4, and S-5)
Massachusetts Hazardous Waste Ground Water Protection Regulations, 310 CMR 30.660	The ground water monitoring requirements are relevant and appropriate. Semi-annual monitoring for specified indicators of hazardous constituents are required to verify the effectiveness of closure. The remedy will comply with the substantive requirements, except that monitoring will be quarterly for the first three years and the frequency will be reevaluated thereafter.	<b>Applicable to design.</b> <i>These requirements will be addressed as described in Section 5.9 of RDWP.</i>	Ground water monitoring will be conducted as described in the Post-Construction Environmental Monitoring Plan, which has been completed in accordance with the OU-1 Statement of Work.

ARAR Review OU-1 Sullivan's Ledge Superfund Site			
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Massachusetts Hazardous Waste Landfill Regulations, 310 CMR 30.620	Landfill requirements include double liners, leachate collection systems, and technical requirements for cap. Double liner requirements are not appropriate to this site, since ground water below landfill will remain contaminated, Other requirements are relevant and appropriate and will be attained, except that leachate collection may be terminated prior to 30 years after closure, if target levels for the passive system have been achieved.	<b>Applicable to design.</b> <i>Landfill requirements include double liners, leachate collection systems, and technical requirements for a cap. Double liner requirements are not appropriate to this site, since ground water below landfill will remain contaminated. Other requirements are relevant and appropriate and must be attained, except that leachate collection may be terminated prior to 30 years after closure, if target levels for the passive system have been achieved.</i>	See Attachment B.
Massachusetts MDWPC Supplemental Requirements for Hazardous Waste Management Facilities, 314 CMR 8	RCRA facilities subject to surface water discharge requirements must also comply with regulations regarding location, technical standards for landfills, closure and post-closure, and management standards.	<b>Not applicable to design.</b> <i>This regulation is not applicable because the ground water treatment plant will be discharging to the POTW.</i>	<b>Not Applicable.</b>

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Massachusetts MDWPC Surface Water Quality Standards, 314 CMR 4	Surface waters must be free from pollutants which are present in toxic amounts, which exceed recommended limits for most sensitive use, or which exceed safe exposure levels. These applicable standards will be attained during remedial design and operation of the treatment system.	<b>Not applicable to design.</b> <i>This regulation is not applicable because the ground water treatment plant will be discharging to the POTW.</i>	<b>Not Applicable.</b>
Massachusetts Wetlands Protection Regulations, 314 CMR 10	This applicable regulation sets performance standards for dredging banks, vegetated wetlands, and lands under water. The remedy and mitigative measures will attain these standards.	<b>Applicable to design.</b> <i>A wetlands restoration plan, as identified in the SOW Section VI.A.1-3, will outline mitigative measure to attain the standards.</i>	The wetlands restoration plan will be provided with the OU-1 design for remediation north of Hathaway Road, after review by OU-2.
Massachusetts Ambient Air Quality Standards 310 CMR 6, and Air Pollution Control Regulations, 310 CMR 7	This applicable regulation sets primary and secondary standards for emissions of particulate matter. These standards will be met during implementation.	<b>Applicable to design.</b> <i>This regulation sets primary and secondary standards for emissions of particulate matter. These standards must be met during implementation.</i>	The design includes requirements for perimeter monitoring (See specification 01130)

ARAR Review OU-1 Sullivan's Ledge Superfund Site			
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Massachusetts Right to Know Regulations	Informational requirements of these regulations will be attained during implementation.	<b>Applicable to design.</b> <i>Informational requirements of these regulations must be attained during implementation.</i>	The design includes requirements for the contractor to meet with the community (See specification 01120)
Standards to be Considered			
Executive Orders 11990 and 11988	These executive orders regarding protection of floodplains and wetlands were considered in the evaluation and development of remedial alternatives. The soil and sediment excavation and stream lining will be conducted in such a manner to avoid or minimize adverse impacts.	<b>Applicable to design.</b> <i>These executive orders regarding protection of floodplains and wetlands were considered in the evaluation and development of remedial alternatives. The soil and sediment excavation and stream lining must be conducted in such a manner to avoid or minimize adverse impacts.</i>	Wetlands restoration plan will be provided with the OU-1 design for remediation north of Hathaway Road, after review by OU-2.
Interim Sediment Quality Criteria	Interim sediment quality criteria were considered in establishing target levels for cleanup of sediments.	<b>Applicable to design.</b> <i>Sediments which exceed site-specific sediment clean-up standards must be excavated and placed under the cap.</i>	The design requires removal of sediment which exceeds site-specific clean-up standards (See specification 02226 and Sheet G-12)

**ARAR REVIEW - ATTACHMENT A**  
**Review of 40 CFR 761.75(b)4-9 - Chemical Waste Landfills**

The following technical requirements of 40 CFR 761.75 are relevant to the design and have been achieved:

- 761.75(b)4: The culverts at Hathaway Road will be augmented to carry the potential flood from the 100-yr storm away from the site. See sheets G-11, G-20, S-4, and S-5 of the Contract Drawings. Run-on control has been designed for the 24-hr, 100-yr storm. See sheets G-6, G-11, G-13, G-19, G-20, S-4, S-5, and S-6 of the Contract Drawings.
- 761.75(b)5: As shown on sheet G-6 of the Contract Drawings, the design maximum cap slope is 4H:IV and in most cases 5H:IV is not exceeded. The design also includes the use of textured liners in certain areas as an additional precaution.
- 761.75(b)6: Ground water and surface water monitoring for the site is consistent with the SOW, and is described in the Post-Construction Environmental Monitoring Plan.
- 761.75(b)7: The design of the passive collection system includes a shallow collection trench and a pump station, as shown on sheets G-7, G-8, G-9, and M-14 of the Contract Drawings and as described in specification 02562 "Ground Water Collection System Piping" and specification 11302 "Ground Water Collection Trench Pumps".
- 761.76(b)8: Specification 02228 "Soil and Debris Relocation" includes requirements for managing liquids and containers during construction.
- 761.75(b)9: As shown on sheets G-6 and G-15 of the Contract Drawings, the design includes access roads and fencing. Requirements for operating and maintaining the cap are described in the Operation and Maintenance Plan.

**ARAR REVIEW - ATTACHMENT B**  
**Review of 310 CMR 30.620 - Landfills**

The following technical requirements of 310 CMR 30.620 are relevant to the design and have been achieved:

- 622(4): The shallow ground water collection system design is shown on sheets G-7, G-8, and G-9 of the Contract Drawings and described in specification 02562 "Ground Water Collection System Piping".
- 622(5): Run-on control has been designed for the 24-hr, 100-yr storm. See sheets G-6, G-11, G-13, G-19, G-20, S-4, S-5, and S-6 of the Contract Drawings.
- 622(6): Run-off control has been designed for the 24-hr, 100-yr storm. See sheets G-6, G-11, G-13, G-19, and G-20 of the Contract Drawings.
- 622(7): The run-on and run-off control systems will be maintained. See Operation and Maintenance Plan.
- 622(8): The design includes perimeter air monitoring during construction. See specification 01130 "Perimeter Air Monitoring and Dust Control Plan".
- 622(9): The design includes a gas venting system with perimeter gas monitoring wells. See sheets G-6 and G-21 of the Contract Drawings and the Post-Construction Monitoring Plan
- 622(10): The design includes access roads. See sheets G-6 and G-20 of the Contract Drawings.
- 622(11): Run-off from the cap will be directed to the Un-named Stream, as is the current case.
- 623: The following specifications require that the manufacturer submit a statement indicating that the cover materials are compatible with the concentrations of constituents found in shallow ground water.

<u>Specification</u>	<u>Title</u>
02291	Geogrids
02292	Geosynthetic Clay Liner
02293	Flexible Membrane (LLDPE) Cover
02294	Synthetic Drainage Layer

- 624: Specification 02293 "Flexible Membrane (LLDPE) Cover" includes detailed requirements for liner testing.
- 629: Specifications 02060 "Building Demolition", 02226 "Sediment Excavation and Placement", and 02228 "Soil and Debris Relocation" discuss procedures for managing liquids.

- 630: Specification 02228 "Soil and Debris Relocation" discusses procedures for managing containers.
- 631: In accordance with the Record of Decision, on-site soils, sediments, and debris are proposed for consolidation and inclusion beneath the cap. Other materials, such as PPE and construction water sediment, are site related and will also be placed beneath the cap.
- 633(1): The cover has been designed to meet these requirements. See sheets G-6 and G-17 of the Contract Drawings, and also the Settlement Analysis Report (O'Brien & Gere, September 1995).
- 633(2): These requirements are discussed in the Operations and Maintenance Plan.





## Implementation/Material Handling Plan

## June 1996





**REPORT**

# **Implementation/Material Handling Plan**

**Sullivan's Ledge Superfund Site  
New Bedford, Massachusetts**

**June 1996**

Report

# Implementation/Material Handling Plan

*Sullivan's Ledge Superfund Site  
New Bedford, Massachusetts*

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Thomas A. Jordan, PE, LSP  
Vice President

June 1996



1200 Crown Colony Drive  
Quincy, MA 02169

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## 1. Introduction

Sections VIII.C.1(d) and VIII.C.1(i) of the SOW require the development of an Implementation Plan and a Material Handling Plan for the work associated with the remediation of Operable Unit 1.

According to Section VIII.C.1(d) of the SOW, the Implementation Plan shall include the following:

- (1) Soil and Sediment Excavation Plan
- (2) Soil and Sediment Treatment Operations Plan
- (3) Cap Construction Plan
- (4) Ground Water Collection and Treatment Plan
- (5) Waste Residual Disposal/Treatment Plan
- (6) Construction Management Plan
- (7) Site Closure Plan

According to Section VIII.C.1(i) of the SOW, the Materials Handling Plan shall:

1. Establish sequencing and guidelines for the movement of all materials
2. Minimize recontamination of treated materials or contamination of uncontaminated materials
3. Coordinate the management and tracking of all materials through completion of remedial activities.

## **Implementation/material handling plan**

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As described in the EPA-approved Remedial Design Work Plan, remedial design is accomplished by specifying appropriate materials and performance requirements to accomplish the remedial action. Means and methods used to achieve the specified performance requirements are the responsibility of the contractor selected for remedial construction. The intent of this Implementation/Material Handling Plan is to provide a "road map" for selected portions of the remedial design.



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## **2. Implementation plan**

### **2.1. Soil and sediment excavation and treatment plan**

#### **2.1.1. Soil and debris**

Sheet G-12 of the Contract Drawings illustrates areas south of Hathaway Road which require excavation of contaminated soils. Specification 02228 "Soil and Debris Relocation" discusses requirements for the following topics:

- Excavation of contaminated soil and placement of that soil on the Disposal Area beneath the cap
- Confirmational sampling of excavated areas for PCBs
- Excavation of soil and debris on the area to be capped and relocation of that soil and debris beneath the cap
- Placement of soil and debris from other portions of the site beneath the cap
- Dewatering of soils
- Management of hazardous wastes for transportation and disposal off-site (if necessary)
- Management of containers
- Management of liquids.

**2.1.2. Sediment**

**[MUST BE COMPLETED AFTER SUBMISSION OF NORTH OF HATHAWAY ROAD DESIGN]**

**2.2. Cap construction plan**

Sheet G-3 of the Contract Drawings shows existing conditions at the Disposal Area. Sheet G-6 shows the following:

- Cap grading plan
- Placement of geogrids to mitigate potential settlement at the edges of the former quarry
- Location of gas vents and monitoring wells
- Location of access roads.

Sheet G-20 presents cross-section at each of the four sides of the cap.

The following specifications include requirements for site preparation and the cap cross section:

02110	Clearing, grubbing, and proof rolling
02228	Soil and debris relocation
02290	Gas venting layer
02291	Geogrids
02292	Geosynthetic clay liner
02293	Flexible membrane cover
02294	Synthetic drainage layer
02295	Barrier protection layer
02981	Topsoil and seeding

This list is not all inclusive, but rather highlights the principle specifications associated with cap construction.

## 2.3. Ground water collection and treatment plan

### 2.3.1. Ground water collection

Sheet G-7 of the Contract Drawings shows the location of:

- Existing monitoring wells on the Disposal Area
- Existing bedrock recovery wells BEI-1, BEI-2, and BEI-3
- Proposed recovery wells OBG-1, OBG-2, and OBG-3
- Proposed shallow collection trench.

Sheets G-8 and G-9 show the profile of the shallow collection trench; sheet M-12 provides a plan and section of the shallow collection trench pump station. Sheet M-13 provides a plan and section of a typical bedrock recovery well. The following sheets provide electrical and instrumentation requirements for ground water collection: I-2 Collection P&ID; E-13 Recovery Well; E-14 Collection Trench Details.

The following specifications include requirements for ground water collection:

02141	Ground Water Monitoring Well Extension and Abandonment
02142	Ground Water Recovery Wells
02561	High Density Polyethylene (HDPE) Pressure Pipe
02562	Ground Water Collection System Piping
02731	HDPE Manholes
11301	Bedrock Recovery Well Pumps
11302	Ground Water Collection Trench Pumps.

This list is not all inclusive, but rather highlights the principle specifications associated with ground water collection.

### 2.3.2. Ground water treatment

Sheet M-1 of the Contract Drawings provides a general layout of the ground water treatment plant. The following sheets also pertain to ground water treatment:

G-10	Ground Water Treatment Plant Grading and Utilities
M-2 through M-11	Mechanical Plans, Sections, and Details
A-1 through A-3	Architectural Plans, Sections, and Details
S-1 through S-3	Structural Plans, Sections, and Details
I-1 through I-10	Piping and Instrumentation
E-1 through E-16	Electrical
H-1 through H-3	HVAC
P-1 through P-3	Plumbing
FP-1	Fire Protection

The following specifications include requirements for ground water treatment:

11360	Plate and Frame Filter Press
11366	Multi Media Filtration System
11376	Ultra Violet Enhanced Chemical Oxidation System
11377	Vapor Phase Carbon Adsorption System
11540	Inclined Plate Clarifier
13203	Hydrogen Peroxide Tank and Accessories
13205	Sulfuric Acid Tank and Accessories
13206	Sodium Hydroxide Tank and Accessories
13417	Process Tanks
16903	Programmable Controllers.

**2.3.3. Operation and Maintenance**

The Operation and Maintenance Plan provides preliminary requirements for operation and maintenance of the ground water collection and treatment systems. The Operations and Maintenance Plan will require update and detailing during implementation of remedial action.

**2.4. Waste residual disposal/treatment plan**

Off-site treatment or disposal is not anticipated to be a major component of the remedy. Specification 02228 "Soil and Debris Relocation", however, includes basic requirements for off-site treatment and disposal, should it be necessary.

---

### 3. Construction management plan

The following specifications pertain to Construction Management:

01100	Remedial Action Work Plan
01110	Construction Quality Control Plan
01120	Health and Safety Plan
01130	Perimeter Air Monitoring and Dust Control Plan
01140	Storm Water Pollution Prevention Plan
01150	Construction Water Management Plan
01160	Spill Prevention, Control, and Countermeasures Plan
01170	Material Handling Plan
01180	Site Security Plan

Specification 01100 "Remedial Action Work Plan" requires the Contractor to describe in detail the Contractor's plan of operation, means and methods of construction, plans for removal and disposal of waste materials, sequence of construction, and other information required to complete the work specified in the Contract Documents. Specification 01100 also requires the development of a project schedule using Critical Path Milestone (CPM) methodology, and includes requirements for progress meetings. Guidelines for project sequencing are included in Special Provision 21.

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#### 4. Material handling plan

According to Section VIII.C.1(i) of the SOW, the Materials Handling Plan shall:

1. Establish sequencing and guidelines for the movement of all materials
2. Minimize recontamination of treated materials or contamination of uncontaminated materials
3. Coordinate the management and tracking of all materials through completion of remedial activities.

Special Provision 21 "Sequencing" and Specification 01170 "Material Handling Plan" establish minimum guidelines for project sequencing and material handling. Other specifications that include requirements to minimize the migration of contamination during construction include, but are not limited to:

01100	Remedial Action Work Plan
01110	Construction Quality Control Plan
01120	Health and Safety Plan
01130	Perimeter Air Monitoring and Dust Control Plan
01140	Storm Water Pollution Prevention Plan
01150	Construction Water Management Plan
01160	Spill Prevention, Control, and Countermeasures Plan
01170	Material Handling Plan
01180	Site Security Plan





**REPORT**

# **Operations and Maintenance Plan**

**Sullivan's Ledge Superfund Site  
New Bedford, Massachusetts**

**June 1996**



**O'BRIEN & GERE**  
ENGINEERS, INC.

**REPORT**

# **Operations and Maintenance Plan**

**Sullivan's Ledge Superfund Site  
New Bedford, Massachusetts**

**June 1996**

Report

# Operations and Maintenance Plan

*Sullivan's Ledge Superfund Site  
New Bedford, Massachusetts*

---

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June 1996



1200 Crown Colony Drive  
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## 1. Introduction

Section VIII.C.1.j of the Statement of Work (SOW) for Operable Unit 1 requires the development of an Operations and Maintenance Plan. Section VIII.C.1.j of the SOW includes the following requirements:

- i. *A post-closure plan in accordance with requirements set forth in 310 CMR 30.590 and 30 CMR 30.633; and*
- ii. *The items in (a) through (k) below:*
  - a. *Maintenance of the integrity and effectiveness of the Remedy, including making repairs to the cap as necessary to correct the effects of settling, subsidence, erosion, or other events;*
  - b. *Maintenance and operation of the ground water monitoring system to monitor the efficiency of closure of the First Operable Unit, as described in Section VI.B.3 of the SOW;*
  - c. *Protection and maintenance of surveyed benchmarks and site security measures in compliance with 310 CMR 30.626;*
  - d. *Prevention of run-off and run-on eroding or otherwise damaging the cap;*
  - e. *Sediments, soils, wetlands, ground water and air monitoring adequate to monitor the effectiveness of the remedy and closure of the First Operable Unit;*
  - f. *Maintenance and operation activities in accordance with TSCA 40 CFR 761.75 (b) (9);*
  - g. *Maintenance and operation activities in accordance with 310 CMR 30.622 (7) through (10);*

- h. Compliance with other applicable state and federal requirements;*
- i. Requirements described in Section VI.B of the SOW;*
- j. Submittal of yearly reports describing the results of the monitoring of implementation and effectiveness of the institutional controls specified in Section VII.A. of the SOW; and*
- k. Maintenance of records for all current structures and equipment remaining on-site or used as components of response activities, or during operation and maintenance. Such reports shall include, at a minimum, the date(s) of purchase(s), maintenance procedures, repair history, warranties and names of service representative(s).*

For convenience, a copy of the cited state and federal regulations are included in Appendix A. 310 CMR 30.593 includes the following Post-Closure Plan requirements:

- a. A description of the planned monitoring activities and frequencies at which they will be performed to comply with the requirements set forth in 310 CMR 30.610 through 30.679
- b. A description of the planned monitoring activities, and frequency at which they will be performed, to ensure
  - 1. The integrity of the cap and final cover or other containment systems in accordance with the requirements set forth in 310 CMR 30.610 through 30.659
  - 2. The function of the monitoring equipment in accordance with the requirements set forth in 310 CMR 30.610 through 30.659

310 CMR 30.633 generally reiterates the requirements of 310 CMR 30.593 and SOW items VIII.C.1.j.ii (a) - (k).

This document has been prepared to address SOW items VIII.C.1.j.i. and SOW items VIII.C.1.j.ii (a), (c), (d), (f), (g), (h), (j), and (k), and is titled the Operations and Maintenance Plan. A separate document, the Post-Construction Environmental Monitoring Plan, addresses the requirements of Section VIII.C.1.j.ii (b), (e), and (i), as well as the monitoring requirements included in 310 CMR 30.590 and 310 CMR 30.633.

As described in the EPA-approved Remedial Design Work Plan for Operable Unit 1, this Operations and Maintenance Plan includes a description of planned maintenance activities and the frequency at which they will be performed. The description of planned maintenance activities and the frequency at which they will be performed, however, is commensurate with that which is feasible at final design. It is therefore recommended that this Operations and Maintenance Plan be updated by the Group upon completion of remedial construction.



---

## 2. Institutional controls

### 2.1. Requirements

Section VIII.A of the Operable Unit 1 Statement of Work requires that the following institutional controls be applied to the First Operable Unit:

1. *Submission of notices to local authorities in accordance with the requirements of 40 CFR § 254.119(a).*
2. *Recording of a notice conforming to the requirements of 40 CFR § 264.119(b) with the Registry of Deeds, Bristol County, for all property included in the First Operable Unit.*
3. *Enactment of zoning restrictions for property within the Disposal Area to prohibit residential use of property within the Disposal Area.*
4. *Securing any and all appropriate actions by the New Bedford City Council, and other agencies or departments of the City of New Bedford, to restrict the use of groundwater within the Site as a drinking water source.*
5. *Restrictions relating to property within the Disposal Area, in a document to be filed with the Registry of Deeds, Bristol County. Such restrictions shall run with the land and shall be binding upon any and all persons who subsequently acquire any interest or portion thereof, to the extent permitted under Massachusetts law.*
  - a. *The Disposal Area shall not be developed for residential use.*

- b. *All plans for development of the property shall be submitted to EPA for approval, in consultation with DEP.*
  - c. *Groundwater underlying the Disposal Area as defined in this SOW, shall not be withdrawn for any purpose, unless otherwise provided for in this SOW. Groundwater supply wells shall not be installed on any part of the Site.*
  - d. *Contaminated soils and sediments shall not be disturbed, except pursuant to a plan approved by EPA, in consultation with DEP.*
  - e. *The cap to be constructed over the Disposal Area and other ground-covering features of the remedy shall not be disturbed or modified in any manner, and no action shall be taken which shall disturb in any manner the integrity or effectiveness of the cover.*
  - f. *No use or activity shall be permitted on the Disposal Area, unless otherwise provided for in this SOW, which will disturb any of the remedial measures implemented at the Site including without limitation: the collection, containment, treatment, and discharge of groundwater; the excavation, dewatering, storage, treatment, and disposal of soils and sediments; and long-term monitoring of groundwater, soils, sediments and wetlands.*
  - g. *Surficial regrading is permitted, but no intrusive earthwork activities beyond six inches shall be conducted. Any landscaping shall be done by bringing fill on the Disposal Area.*
6. *Restrictions relating to property which is part of the Site but is outside the Disposal Area, and specifically including contaminated areas within the Whaling City Golf Course, in a document to be filed with the Registry of Deeds, Bristol County. Such restrictions shall run with the land and shall be binding upon any and all persons who subsequently acquire any interest or portion thereof, to the extent permitted under Massachusetts Law.*

- a. *All plans for development of the property shall be submitted to EPA for approval, in consultation with DEP.*
- b. *Groundwater underlying the Site shall not be withdrawn for any purpose unless otherwise provided in this SOW. Groundwater supply wells shall not be installed on any part of the Site.*
- c. *Earthwork activities in areas of soil contamination, including landscaping, may only include surficial regrading. No intrusive earthwork activities beyond six inches shall be conducted, except pursuant to a plan approved by EPA, in consultation with DEP.*
- d. *No use or activity shall be permitted on the First Operable Unit, unless otherwise provided for in this SOW, which will disturb any of the remedial measures implemented at the Site including without limitation: the collection, containment, treatment, and discharge of groundwater; the excavation, dewatering, storage, treatment, and disposal of soils and sediments; and long-term monitoring of groundwater, soils, sediments and wetlands.*
- e. *Contaminated soils and sediments shall not be disturbed, except pursuant to a plan approved by EPA, in consultation with DEP.*

## 2.2. Reporting

It is recommended that yearly reports describing the results of the monitoring of implementation and effectiveness of the institutional controls specified in Section VII.A of the SOW be submitted to EPA.

---

### **3. Cap**

#### **3.1. Cover**

It is recommended that inspections of the newly seeded cover be conducted weekly until vegetation is established on the site. Following establishment of vegetation, routine inspection of the cover is recommended monthly during the first year and quarterly thereafter. Should areas of settlement, erosion, or slope instability be noted, it is recommended that regrading and/or restoration be conducted to promote drainage, minimize erosion, and minimize percolation of water into the cover. The routine cover inspection should also note problems with thinning vegetation. Areas which appear to be thinning over time should be overseeded to keep the vegetative cover uniform.

It is recommended that the vegetative cover be mowed twice annually (once in July and once in September) to maintain satisfactory runoff and to retard the establishment of deep-rooting shrubs, bushes, and trees on the cover.

#### **3.2. Surveyed benchmarks**

It is recommended that an on-site surveyed benchmark be maintained. It is recommended that the benchmark be inspected for signs of damage at the same frequency as the cover.

#### **3.3. Run-on/run-off controls**

It is recommended that run-on/run-off controls, including swales, berms, catchbasins, vaults, headwalls, and the sedimentation basin, be inspected at the same frequency as the cover. Drainage facilities

should be inspected for accumulation of debris and obstructions, which may inhibit flow, and for excessive scouring, which may erode ditches, swales, and berms. Debris and obstructions found in drainage facilities should be removed promptly to maintain flow capacity. If excessive scouring is noted, channel protection, consisting of rip-rap and/or geosynthetic materials, is recommended to augment the existing system. Where swales and berms are vegetated, the vegetation should be inspected and maintained as described under the section titled "Cover."

### **3.4. Gas venting system**

It is recommended that the gas vents be inspected with the same frequency as the cover, for signs of damage or obstruction. Damaged or obstructed vents should be repaired or cleared promptly.

It is recommended that the perimeter gas monitoring wells be sampled in accordance with the Post-Construction Environmental Monitoring Plan. Perimeter gas monitoring wells should be repaired or replaced promptly, if damaged.

### **3.5. Site security**

It is recommended that a site security inspection be conducted monthly. It is recommended that breaches in fence integrity be repaired promptly and that signs be replaced promptly.

### **3.6. Access roads**

It is recommended that access roads on the Disposal Area be inspected annually and repaired promptly, as necessary to support the operation and maintenance of the site, without causing safety or nuisance problems or hazardous conditions.

It is recommended that access roads be maintained so that traffic will flow smoothly and not interrupted by inclement weather. It is

recommended that snow be plowed from access roads promptly to allow access to the site for maintenance. It is recommended that the use of road salt be limited to those areas which do not drain to the vegetative cover.

### 3.7. Instrument survey

It is recommended that the cap be instrument surveyed forty days after completion. If the slope of the top of the cover decreases from the design minimum of 4% to less than 3% due to settlement, it is recommended that additional cover material be placed on those areas of the cover to re-establish a 4% slope. An instrument survey of the cap is also recommended one year, two years, and five years after cap completion, with additional cover material being placed on portions of the cap where settlement results in less than a 3% slope, to re-establish a 4% slope.

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## 4. Ground water recovery and treatment

### 4.1. Ground water recovery

#### Active collection system

Based on ground water flow modelling of the bedrock unit, the design drawdown in each of the six recovery wells is approximately 30 ft. Prior to startup, static ground water levels will be measured in all wells in the study area (Operable Units 1 and 2). Step tests will be conducted from the three new recovery wells (OBG-1,2, and 3) to assess flow rates from these wells. The cumulative design flow rate for the active collection system is 12 gpm. Upon startup of the active system, the drawdown in the recovery wells will be maintained within 25-35 ft by control devices in the wells for the first two months. Precipitation will be monitored at the nearby gage at the New Bedford Airport.

Ground water levels will be monitored in each study area well once per week for the first two months. Readings will be collected from a pre-surveyed mark on each well riser and data will be entered into a Quattropro 6.0 or equivalent data management program. The water level data will be grouped according to the four main hydrogeologic units identified at the site (overburden, shallow, intermediate, and deep bedrock).

After two months of operation, a technical memorandum will be prepared which will assess the cumulative cones of influence generated over the period of operation. Key wells from each stratigraphic unit within OU-1 will be identified and drawdown graphs will be prepared to assess the effects on each unit. Precipitation will also be plotted to assist in evaluating the hydraulic performance of each unit.

A linear triangulation data contouring program (Quicksurf) or equivalent will be used to prepare two dimensional contour maps of each unit at the end of one month and two months of operation. From this, an evaluation of the horizontal and vertical flow gradients will be made and compared to static conditions. If the drawdowns appear to be uniform with depth across the various units, a three dimensional program (Spatial Explorer) or equivalent may be used to plot the cumulative cones in three dimensions.

Conclusions will be drawn to the extent practical with regard to whether the capture zone is sufficient to control the off-site migration of constituents in the various units. Recommendations will be provided to modify drawdowns in the recovery wells to fulfill the objectives of the capture system. The schedule of future water level monitoring will also be provided.

**Passive collection system**

The passive collection system includes a modification to collect deeper overburden ground water migrating through a buried bedrock trough on the north side of the disposal area. The ground water migration in the overburden will be appropriately controlled by the passive collection system and funneled to the treatment system.

The initial flow rate from the passive system may approach the design treatment capacity of 30-40 gpm for this system due to initial dewatering that may be required. Longer term flow rates from the overburden will likely decrease due to reduction of precipitation recharge and the effects from the active system.

The linear contouring of overburden water levels described for the active system above will evaluate the effectiveness of the passive system to collect overburden ground water migrating off-site. The technical memorandum described above will also summarize the performance of the passive system compared to the design objectives.

## **4.2. Ground water treatment**

A process flow diagram for the ground water treatment plant is included in Appendix B. As shown on the process flow diagram, the treatment plant is designed to function in two modes:



Primary process: Flow equalization; acidification of ground water to 2.0-3.0 S.U.; filtration; uv-oxidation; and neutralization of ground water to 6.5 S.U. It is the intent of this process to keep iron in solution.

Secondary process: Flow equalization; oxidation of iron using hydrogen peroxide; clarification; filtration; acidification (if necessary); uv-oxidation; and neutralization (if necessary). It is the intent of this process to remove iron early in the treatment process.

Piping and instrumentation drawings, provided in the design package, describe the details of the intended operation. Equipment manuals, piping layouts, set-points, and operational information will not be available until after construction and start-up. It is recommended that a detailed Operations and Maintenance Plan be developed after construction and during start-up, that would include site-specific equipment manuals as well as optimum operational set-points based on operation of the system during start-up.

### **4.3. Ground water treatment plant monitoring**

Requirements for influent and effluent ground water quality monitoring are provided in the Post-Construction Environmental Monitoring Plan.

Requirements for monitoring air emissions from the ground water treatment plant are provided in the Post-Construction Environmental Monitoring Plan.

### **4.4. Hazardous waste management**

Requirements for management of hazardous waste associated with the ground water treatment plant are as follows:

Section V.E.3 of the SOW requires that off-site shipment or transport and disposal of hazardous wastes be in accordance with applicable RCRA and Department of Transportation

(DOT) Regulations: 49 CFR 171-179 and 387; and 310 CMR 30.00.

Section V.E.3 of the SOW requires that hazardous wastes to be sent off-site for treatment or disposal be sent to a disposal facility which is operating in compliance with appropriate RCRA and/or TSCA requirements, in accordance with Section 121(d) (3) of CERCLA.

Section V.E.4 of the SOW requires compliance with applicable or relevant and appropriate portions of 40 CFR Parts 264 through 268, to the extent that Federal regulations governing hazardous wastes have been promulgated for which there is no Massachusetts counterpart under the authorized state program.

#### **4.5. Period of operation**

It is required in the SOW that ground water recovery and treatment continue at the site until ground water cleanup criteria are achieved, as described in the Post-Construction Environmental Monitoring Plan.

#### **4.6. Records**

It is recommended that records be maintained for structures and equipment remaining on-site or used as components of response activities, or during operation and maintenance. Such records should include, at a minimum, the date(s) of purchase(s), maintenance procedures, repair history, warranties, and names of service representative(s).

## Appendix A



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compliance with the requirements of 310 CMR 30.000 and of the approved closure plan, and

(b) the survey plat required by 310 CMR 30.586 has been recorded in the appropriate Registry of Deeds or, if the land in question is registered land, in the registry section of the land court for the district wherein the land lies, and copies of the plat have been submitted to the Department and to the Board of Health of the city or town wherein the land lies, in compliance with 310 CMR 30.586.

(2) Until the Department, pursuant to 310 CMR 30.904(8), notifies the owner or operator in writing that he is no longer required to maintain financial assurance for closure of the facility, the owner or owner and the independent Massachusetts registered professional engineer who signed the certification required pursuant to 310 CMR 30.587(1) shall each promptly submit to the Department on request any documentation supporting said certification.

(3) Closure shall not be considered complete until so certified in writing by the Department.

**30.588 - 30.589: [Reserved]**

**30.590: Post-Closure**

**30.591A: Applicability**

[Effective through June 30, 1988]

The post-closure requirements in 310 CMR 30.590 through 30.595 apply to the owners and operators of all facilities at which hazardous waste will remain after closure.

**30.591B: Applicability**

[Effective on and after July 1, 1988]

The requirements in 310 CMR 30.590 through 30.596, cited collectively as 310 CMR 30.590, apply to the owners and operators of all hazardous waste management units and facilities at which hazardous waste will remain after closure.

**30.592: Post-Closure Care and Use of Property**

(Effective on and after July 1, 1988)

(1) Post-closure care for each hazardous waste management unit subject to the requirements of 310 CMR 30.590 shall begin after completion of closure of the unit, shall continue for 30 years after that date, and shall consist of at least the following:

(a) Monitoring and reporting in accordance with the requirements set forth in 310 CMR 30.610 through 30.679.

(b) Maintenance and monitoring of waste containment systems in accordance with the requirements set forth in 310 CMR 30.610 through 30.679.

(2) At any time preceding completion of closure of a particular hazardous waste management unit subject to the requirements of 310 CMR 30.590, or at any time during the post-closure period of that hazardous waste management unit or facility, the Department may shorten the post-closure period applicable to that hazardous waste management unit or facility

(a) if all hazardous waste management units or facilities have been closed, and

(b) if the Department determines that such action is sufficient to protect public health, safety, or welfare, or the environment (e.g., leachate or ground water monitoring results, characteristics of the hazardous wastes, application of advanced technology, or alternative disposal, treatment, or re-use techniques indicate that the hazardous waste management unit or facility is and would continue to be secure), and

(c) if the owner or operator requests the Department to take such action by filing an application that complies with the requirements in 310 CMR 30.082 through 30.807, and

(d) only after the Department complies with the requirements and procedures set forth in 310 CMR 30.851 and 30.852, and, if applicable, 310 CMR 30.833, 30.835, 30.836, 30.837, and 30.839, and

(e) if such action is accordance with all other applicable provisions of 310 CMR 30.800.

(3) At any time preceding completion of closure of a particular hazardous waste management unit or facility subject to the requirements of 310 CMR 30.590, or at any time during the post-closure period of that hazardous waste management unit or facility, the Department may extend the post-closure period applicable to that hazardous waste management unit or facility

(a) if the Department determines that such action is necessary to protect public health, safety, or welfare, or the environment (e.g., leachate or ground water monitoring results indicate a potential for migration of hazardous wastes at levels which might be harmful to public health, safety, or welfare, or the environment), and

(b) after the Department complies with the requirements and procedures set forth in 310 CMR 30.851 and 30.852, and, if applicable, 310 CMR 30.833, 30.835, 30.836, 30.837, and 30.839, except as provided in 310 CMR 30.020 and 30.030, and

(c) if such action is accordance with all other applicable provisions of 310 CMR 30.800.

(4) The Department may require continuation, after closure, of any of the security requirements of 310 CMR 30.514 during part or all of the post-closure period if:

- (a) Hazardous wastes might remain exposed after completion of closure, or
- (b) Access by the public or domestic livestock might pose a hazard to public health, safety, or welfare, or the environment.

(5) Post-closure use of property on or in which hazardous wastes remain after closure shall never be allowed to disturb the integrity of the final cover, liner(s), or any other components of any containment system, or the function of the facility's monitoring systems, unless the Department determines in writing that the disturbance:

- (a) Is necessary to the proposed use of the property and will not increase the potential hazard to public health, safety, or welfare or the environment; or
- (b) Is necessary to reduce a threat to public health, safety or welfare or the environment.

(6) All post-closure care activities shall be in compliance with the provisions of the approved post-closure plan as specified in 310 CMR 30.593.

### **30.593: Post-Closure Plan**

(Effective on and after July 1, 1988)

(1) The owner or operator of a hazardous waste management unit or facility subject to the requirements of 310 CMR 30.590 shall have a written post-closure plan that complies with the requirements of 310 CMR 30.590. The owner or operator of a facility at which there is a surface impoundment described in 310 CMR 30.617(5) or a waste pile described in 310 CMR 30.649(3) from which the owner or operator intends to remove all hazardous waste at closure shall have a contingent post-closure plan that complies with the requirements of 310 CMR 30.590 and, as applicable, in 310 CMR 30.617(5) and 30.649(3). Owners or operators of surface impoundments or waste piles not otherwise required to have contingent post-closure plans shall submit a post-closure plan to the Department within 90 days after the owner or operator or the Department determines that the surface impoundment or waste pile shall be closed as a landfill. Each post-closure plan shall identify the activities that shall, and each contingent post-closure plan shall identify the activities that might, be carried on after closure and the frequency of these activities, and shall include at least:

- (a) A description of the planned monitoring activities and frequencies at which they will be performed to comply with the requirements set forth in 310 CMR 30.610 through 30.679, and
- (b) A description of the planned maintenance activities, and frequencies at which they will be performed, to ensure:

1. The integrity of the cap and final cover or other containment systems in accordance with the requirements set forth in 310 CMR 30.610 through 30.659, and

2. The function of the monitoring equipment in accordance with the requirements set forth in 310 CMR 30.610 through 30.679, and

(c) The name, address, and telephone number of the person or office to contact about the hazardous waste management unit or facility during the post-closure care period. This individual or office shall keep at all times during the post-closure period an updated copy of the approved post-closure plan.

(2) Amendments of post-closure plans shall be subject to the following provisions.

(a) All applications to the Department for approval to amend a facility's post-closure plan shall include a copy of the proposed amended post-closure plan. The owner or operator shall submit a written notification of or request for a license modification to authorize a change in the approved post-closure plan in compliance with 310 CMR 30.802 through 30.807. The Department shall classify the proposed amendment in accordance with 310 CMR 30.852. The Department shall act in accordance with the requirements and procedures set forth in 310 CMR 30.852.

(b) The owner or operator may apply to the Department for approval to amend the facility's post-closure plan at any time during the active life of the facility or during the post-closure care period. Except as provided in 310 CMR 30.852 and 30.890, denial of an application to amend a post-closure plan shall not be subject to public notice, public comment, or public hearings.

(c) The owner or operator shall apply to the Department for approval to amend the facility's post-closure plan whenever

1. changes in operating plans or facility design affect the post-closure plan, or

2. there is a change in the expected year of final closure, if applicable, or

3. events which occur during the active life of the facility, including but not limited to closures (and changes in applicable regulations when published in the Massachusetts Register), require a modification of the approved post-closure plan, or

4. the Department requests or orders an amendment of the facility's post-closure plan.

(d) The deadline for the owner or operator to file required applications to the Department for approval to amend the facility's post-closure plan shall be as follows:

1. At least 60 days prior to a proposed change in facility design or operation.

2. Not more than 60 days after an unexpected event has occurred (including, but not limited to, a change in applicable regulations when published in the Massachusetts Register that affects the post-closure plan.

3. Not more than 60 days after the Department requests or orders an amendment of the

facility's closure plan, or 90 days if the hazardous waste management unit is a surface impoundment or waste pile not previously required to prepare a contingent post-closure plan.

**30.594: Recording Notice Of License And Of Past Disposal**

(1) Within sixty (60) days of certification of closure of the first hazardous waste management unit subject to the requirements of 310 CMR 30.590, and within sixty (60) days of certification of closure of the last hazardous waste management unit subject to the requirements of 310 CMR 30.590, the owner or operator shall record in the appropriate Registry of Deeds or, if the land in question is registered land, in the registry section of the land court for the question is registered land, in the registry section of the land court for the district wherein the land lies, a notice that:

(a) the land has been used to manage hazardous wastes, and

(b) the land's use is restricted pursuant to 310 CMR 30.592(5), and

(c) the survey plat and record required by 310 CMR 30.586 have been recorded in the Registry of Deeds and copies thereof have been submitted to the Department and to the Board of Health of the city or town wherein the land lies.

(2) The landowner shall submit to the Department a certified copy of each notice described in 30.594(1), including the date and book and page numbers of recording of such notice, within thirty (30) days after the landowner receives the recorded notice from the registry.

**30.595: Subsequent Removal Of Hazardous Waste And Hazardous Waste Containment Systems**

(1) If the owner or operator or any subsequent owner or operator of the land upon which is located a hazardous waste management unit or facility subject to the requirements of 310 CMR 30.590 wishes to remove hazardous wastes, hazardous waste residues, the liner if any, or contaminated soils, he shall apply to the Department for approval to do so. The Department may grant such approval but

(a) only if the owner or operator applies for such approval in compliance with the requirements and procedures set forth in 310 CMR 30.802 through 30.807, and

(b) only after the Department complies with the requirements and procedures set forth in 310 CMR 30.851 and 30.852, and, if applicable, 310 CMR 30.833, 30.835, 30.836, 30.837, and 30.839, and

(c) such approval shall be subject to all other applicable provisions of 310 CMR 30.800, and

(d) in addition, such approval may be granted, and may be allowed to remain in effect, only if the owner or operator has persuaded the Department that the removal of the material in question will be in compliance with the requirements set forth in 310 CMR 30.592(5).



(2) If the Department grants the approval described in 310 CMR 30.595(1), the person granted such approval may request that the Department give written verification of such removal. If the Department verifies in writing that the material in question has been removed in compliance with such approval, the person requesting the verification may record that verification in the appropriate Registry of Deeds or, if the land in question is registered land, in the registry section of the land court for the district wherein the land lies.

**30.596: Completion And Certification Of Post-Closure Care**

[Effective on and after July 1, 1988]

(1) No later than sixty (60) days after completion of the established post-closure care period for each hazardous waste management unit or facility subject to the requirements of 310 CMR 30.590, the owner or operator shall submit to the Department, either by hand-delivery or by certified mail, a certification signed by both the owner or operator and by an independent Massachusetts registered professional engineer that

(a) post-closure care was performed for the hazardous waste management unit or facility, as applicable, for the required period in compliance with the requirements of 310 CMR 30.000 and of the approved post-closure plan, and

(b) the survey plat required by 310 CMR 30.586 has been recorded in the appropriate Registry of Deeds or, if the land in question is registered land, in the registry section of the land court for the district wherein the land lies, and copies of the plat have been submitted to the Department and to the Board of Health of the city or town wherein the land lies, in compliance with 310 CMR 30.586.

(c) the notices required by 310 CMR 30.040 and 30.594 have been recorded in the appropriate Registry of Deeds or, if the land in question is registered land, in the registry section of the land court for the district wherein the land lies, and copies of the notices have been submitted to the Department in compliance with 310 CMR 30.040 and 30.594.

(2) Until the Department, pursuant to 310 CMR 30.906(8), notifies the owner or operator in writing that he is no longer required to maintain financial assurance for post-closure care of the facility, the owner or owner and the independent Massachusetts registered professional engineer who signed the certification required pursuant to 310 CMR 30.596(1) shall each promptly submit to the Department on request any documentation supporting said certification.

(3) Post-closure care shall not be considered complete until so certified in writing by the Department.

**30.597 - 30.599: [Reserved]**

(5) The owner or operator shall design, construct, operate and maintain a run-on control system capable of preventing flow onto the active portion of the landfill during peak discharge from at least a 100-year storm.

(6) The owner or operator shall design, construct, operate and maintain a run-off management system to collect and control at least the water volume resulting from a 24-hour, 100-year storm. If the collected run-off is hazardous waste pursuant to 310 CMR 30.100, it shall be managed as hazardous waste in compliance with 310 CMR 30.000. If the collected run-off is discharged to surface water or groundwater, such discharge is subject to M.G.L. c. 21, s. 43.

(7) To maintain design capacity of the system, collection and holding facilities (e.g., tanks, basins) associated with run-on and run-off control systems shall be emptied or otherwise managed expeditiously after storms.

(8) If a landfill contains any particulate matter which may be subject to wind dispersal, the owner or operator shall cover or otherwise manage the landfill to control wind dispersal.

(9) The owner or operator shall design and operate the facility so that, where necessary to protect public health, safety and welfare and the environment, the migration of toxic, ignitable or otherwise harmful emissions from the facility site shall be controlled.

(10) The owner or operator shall provide, and maintain in good repair, access roads at the landfill site. Such access roads shall be designed, constructed and maintained so that traffic will flow smoothly at all times and will not be interrupted by inclement weather.

(11) Landfills shall be equipped with suitable channeling devices, such as ditches, berms or settling basins, to prevent run-off originating from the landfill site which could cause interference with natural drainage of adjacent land(s).

### **30.623: Demonstration Of Waste/Liner Compatibility**

Submitted with the license application shall be a demonstration that the waste(s) and leachate that may be in contact with the liners are compatible with the liner materials to be used. The license applicant shall persuade the Department that the wastes will not cause any detrimental effect (e.g., cause cracks, swelling, decrease in mechanical strength, change in chemical properties or increase in permeability) on the liner material(s) used to prevent leakage into or out of the space between the liners. This demonstration shall be made by:

(1) conducting field tests or laboratory tests which are approved by the Department; all such testing shall be fully documented and submitted with the license application; or

(2) submitting to the Department historical data which documents successful use of the particular liner material to be used with the waste(s) and leachate to which the liner materials will

engineer knowledgeable in matters of hazardous waste disposal. The owner or operator shall submit a copy of said contract to the Department with the license application. The contract shall provide for the following minimum requirements:

(a) During site preparation, the engineer shall provide sufficient supervision, assistance and inspection to enable him to certify that preparation of the site has been done in accordance with the plans which were approved by the Department.

(b) During the operation of the landfill,

1. The engineer shall provide daily supervision, engineering assistance, and plan interpretation during the first week of operation.

2. The engineer shall conduct monthly inspections during the first year of operation to ensure compliance with the approved plans.

3. Thereafter, the engineer shall conduct inspections of the landfill operation at least once every two (2) months.

(c) The engineer shall comply with 310 CMR 30.625(3) and (4).

(2) After expiration of the period specified in 310 CMR 30.625(1), there shall be in effect at all times a contract properly executed by the owner or operator and by an independent Massachusetts registered professional engineer knowledgeable in matters of hazardous waste disposal. The owner or operator shall submit to the Department a copy of each such contract. Each such contract shall provide for the following minimum requirements:

(a) The engineer shall conduct inspections at least once every two (2) months; and

(b) The engineer shall comply with 310 CMR 30.625(3) and (4).

(3) After each site inspection, the engineer shall prepare a written report for the owner or operator. This report shall be part of the facility's operating record and shall be kept in compliance with 310 CMR 30.541 through 30.543. The engineer shall also submit a copy of this report to the Department within fifteen (15) days of the inspection.

(4) The engineer shall promptly notify the Department of any and all deviations from the approved plans and operating procedure.

### **30.626. Surveying And Record Keeping**

The owner or operator of a hazardous waste landfill shall maintain the following items in the operating record required pursuant to 310 CMR 30.542:

(1) On a map, the exact location and dimensions, including depth, of each cell with respect to permanently surveyed benchmarks, and

- (2) The contents of each cell and the approximate location of each waste type within each cell.

**30.627: Equipment**

(1) The owner or operator shall provide equipment in adequate numbers and of appropriate type and size for the proper operation of the landfill in accordance with good engineering practice and in compliance with 310 CMR 30.000:

(2) The owner or operator shall make provisions for the routine maintenance of equipment and to assure satisfactory performance capability for the various operations necessary for excavation, compaction, transportation, covering and other aspects of a landfill, and for the prompt repair or replacement of said equipment.

(3) The owner or operator shall provide at the site suitable shelter or protection for all equipment and service supplies used in connection with landfill operation.

(4) The owner or operator shall make arrangements for providing standby equipment in the event of breakdown of regular equipment. Such standby equipment shall be available for use and shall be provided within twenty-four (24) hours of such breakdown; otherwise the landfill area shall be closed for receipt of waste until equipment becomes available.

**30.628: Special Requirements For Ignitable, Reactive, And Incompatible Hazardous Wastes, And Hazardous Wastes That Are Polyhalogenated Aromatic Hydrocarbons**

(1) Ignitable or reactive hazardous waste shall not be disposed of in a landfill.

(2) Incompatible hazardous wastes, or materials incompatible with hazardous wastes (see 310 CMR 30.561 for examples) shall not be placed in the same landfill cell unless 310 CMR 30.560(3) is complied with.

(3) Polyhalogenated aromatic hydrocarbons shall not be placed in a landfill except in accordance with all other applicable provisions of 310 CMR 30.620 and in accordance with the terms and conditions of a management plan, approved by the Department, for such placement. Compliance with such a plan, when approved, shall be a condition of a license issued pursuant to 310 CMR 30.000. The Department may approve a management plan for the placement of polyhalogenated aromatic hydrocarbons in a landfill only if, after considering at least the following criteria, the Department determines that such approval is in accordance with provisions set forth in 310 CMR 30.810 through 30.911:

(a) The volume and physical and chemical characteristics of the polyhalogenated aromatic hydrocarbons, including their potential to migrate through the soil or to volatilize or escape into the atmosphere.

(b) The volume and physical and chemical characteristics of the other materials placed into the

**30.633: Closure And Post-Closure Care**

(1) At final closure of the landfill or upon closure of any cell, the owner or operator shall cover the landfill or cell with a final cover designed and constructed to:

- (a) Provide long-term minimization of migration of liquids through the closed landfill;
- (b) Function with minimum maintenance;
- (c) Promote drainage and minimize erosion or abrasion of the cover;
- (d) Accommodate settling and subsidence so that the cover's integrity is maintained; and
- (e) Have a permeability less than or equal to the permeability of the bottom liner system.

(2) (Effective on and after July 1, 1988) After final closure of the landfill or upon closure of any cell, the owner or operator shall comply with all post-closure requirements set forth in 310 CMR 30.590, including, without limitation, maintenance and monitoring throughout the post-closure care period as specified pursuant to 310 CMR 30.592. The owner or operator shall:

- (a) Maintain the integrity and effectiveness of the final cover, including making repairs to the cap to correct the effects of settling, subsidence, erosion or other events;
- (b) Maintain and monitor the leak detection, collection and removal system in compliance with 310 CMR 30.622(3);
- (c) Continue to operate the leachate collection and removal system;
- (d) Maintain and monitor the groundwater monitoring system and comply with all other applicable requirements of 310 CMR 30.660;
- (e) Prevent run-off and run-on from eroding or otherwise damaging the final cover;
- (f) Maintain access roads in compliance with 310 CMR 30.622(10);
- (g) Maintain gas collection and control systems, where present; and
- (h) Protect and maintain surveyed benchmarks used in complying with 310 CMR 30.626.

(3) During the post-closure period, if liquid leaks into the leak detection, collection and removal system, the owner or operator shall comply with the provisions of 310 CMR 30.622(3).

**30.634 - 30.639: [Reserved]**

**30.640: Waste Piles**

(1) 310 CMR 30.640 through 30.649 prescribe requirements which apply to owners and

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*(9) Supporting facilities.*

(i) A six foot woven mesh fence, wall, or similar device shall be placed around the site to prevent unauthorized persons and animals from entering.

(ii) Roads shall be maintained to and within the site which are adequate to support the operation and maintenance of the site without causing safety or nuisance problems or hazardous conditions.

(iii) The site shall be operated and maintained in a manner to prevent safety problems or hazardous conditions resulting from spilled liquids and windblown materials.

*(c) Approval of chemical waste landfills.* Prior to the disposal of any PCBs and PCB Items in a chemical waste landfill, the owner or operator of the landfill shall receive written approval of the Agency Regional Administrator for the Region in which the landfill is located. The approval shall be obtained in the following manner:

*(1) Initial report.* The owner or operator shall submit to the Regional Administrator an initial report which contains:

- (i) The location of the landfill;
- (ii) A detailed description of the landfill including general site plans and design drawings;
- (iii) An engineering report describing the manner in which the landfill complies with the requirements for chemical waste landfills specified in paragraph (b) of this section;
- (iv) Sampling and monitoring equipment and facilities available;
- (v) Expected waste volumes of PCBs;
- (vi) General description of waste materials other than PCBs that are expected to be disposed of in the landfill;
- (vii) Landfill operations plan as required in paragraph (b) of this section;
- (viii) Any local, State, or Federal permits or approvals; and
- (ix) Any schedules or plans for complying with the approval requirements of these regulations.

*(2) Other information.* In addition to the information contained in the report described in paragraph (c)(1) of this section, the Regional Administrator may require the owner or operator to submit any other information that the Regional Administrator finds to be reasonably necessary to determine whether a chemical waste landfill should be approved. Such other information shall be restricted to the types of information required in paragraphs (c)(1) (i) through (ix) of this section.

*(3) Contents of approval.*





**REPORT**

# **Post-Construction Environmental Monitoring Plan**

**Sullivan's Ledge Superfund Site  
New Bedford, Massachusetts**

**June 1996**



**O'BRIEN & GERE**  
ENGINEERS, INC.

**REPORT**

# **Post-Construction Environmental Monitoring Plan**

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New Bedford, Massachusetts**

**June 1996**

Report

# Post-Construction Environmental Monitoring Plan

*Sullivan's Ledge Superfund Site  
New Bedford, Massachusetts*

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Thomas A. Jordan, PE, LSP  
Vice President

June 1996



1200 Crown Colony Drived  
Quincy, Massachusetts

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## 1. Introduction

The purpose of this plan is to summarize, in one document, post construction environmental monitoring that is required by the Statement of Work (SOW) for Operable Unit 1 of the Sullivan's Ledge Superfund Site.

Section VIII, C.1.d.iii(c) of the SOW requires the development of an Operations and Maintenance Plan. The requirements of the Operations and Maintenance Plan that pertain to post construction environmental monitoring include:

*C.1.j.ii(b): Maintenance and operation of the ground water monitoring system to monitor the efficiency of closure of the First Operable Unit, as described in Section VI.B.3. of the SOW.*

*C.1.j.ii(e): Sediments, soils, wetlands, ground water and air monitoring adequate to monitor the effectiveness of the remedy and closure of the First Operable Unit.*

*C.1.j.ii(i): Requirements described in Section VI.B of the SOW.*

Section IX.B.1.d of the SOW also includes requirements for post-construction monitoring. Specifically:

*B.1.d.i(b): Monitoring of...ground water...to determine compliance with cleanup standards and performance standards and to document contaminant concentrations over time as specified in Sections ...V.C and VI.B of the SOW.*

*B.1.d.i(c): Assessment of wetlands to determine the success wetlands restoration program, as specified in Section VI.A of the SOW.*

This document has been prepared to address these requirements. This document does not, however, include environmental sampling required to verify site closure. These sampling requirements are discussed in the Site Closure Plan.

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## 2. Ground water

### 2.1. Compliance monitoring

The following compliance monitoring program addresses Section V.C. (1-4) of the SOW. Compliance monitoring shall be conducted while the ground water treatment plant is operating, and until ground water clean-up standards are achieved.

#### 2.1.1. Active extraction system compliance monitoring and standards

The following components comprise the compliance monitoring program for the active extraction system:

##### 2.1.1.1. Water levels

Water levels in the monitoring wells to be sampled shall be measured prior to sampling.

##### 2.1.1.2. Bedrock monitoring wells

The following bedrock monitoring wells shall be sampled on a quarterly schedule:

###### Inside Disposal Area

MW-13  
MW-17  
MW-24  
GCA-1

###### Outside Disposal Area

MW-5  
MW-6  
MW-8  
MW-10  
MW-10B

##### 2.1.1.3. Westbay monitoring wells

The following zones in the Westbay monitoring wells shall be sampled on a quarterly schedule:

ECJ1-37'	ECJ2-47'	ECJ3-51'	ECJ4-62'
ECJ1-62'	ECJ2-82'	ECJ3-91'	ECJ4-87'
ECJ1-72'	ECJ2-117'	ECJ3-126'	ECJ4-132'
ECJ1-122'	ECJ2-152'	ECJ3-146'	ECJ4-162'
ECJ1-148'	ECJ2-187'	ECJ3-236'	ECJ4-227'
ECJ1-267'		ECJ3-271'	ECJ4-245'



**2.1.1.4. Bedrock/Westbay analytical program**

Ground water samples from bedrock and Westbay monitoring wells shall be analyzed for the following parameters:

PCBs (unfiltered)  
VOCs  
Metals (filtered and un-filtered)\*  
SVOCs\*

\*after the first four consecutive quarters, these parameters shall be analyzed on an annual basis.

Analytical methods are shown in Appendix A.

**2.1.1.5. Overburden monitoring wells**

The following overburden monitoring wells shall be sampled initially for four consecutive quarters, and annually thereafter:

<u>Inside Disposal Area</u>	<u>Outside Disposal Area</u>
MW-13A	MW-5A
MW-15	MW-6
MW-16	MW-8A
	MW-10A

**2.1.1.6. Overburden analytical program**

Ground water samples from overburden monitoring wells shall be analyzed for the following parameters:

PCBs (unfiltered)  
VOCs  
Metals (filtered and un-filtered)  
SVOCs

Analytical methods are shown in Appendix A.

**2.1.1.7. Flow rate monitoring**

Pumping and flow rates will be monitored on a weekly basis.

**2.1.1.8. Monitoring well replacement**

Consistent with the Consent Decree, Settling Defendants shall maintain and replace monitoring wells as necessary, including the multi-level monitoring wells.

**2.1.1.9. Active extraction system cleanup standard**

The Cleanup Standard for the active extraction system is the significant reduction in the mass of bedrock contamination in ground water bedrock monitoring wells which are designated as points of compliance. EPA, in consultation with DEP, will evaluate achievement of this Cleanup Standard by using two criteria: (1) a concentration range of 1 to 10 ppm of total volatile organic compounds (VOCs); and/or (2) an asymptotic curve using groundwater monitoring data indicating that significant concentration reductions of VOCs are no longer being achieved. The groundwater monitoring data curves will be asymptotic when the rate of change in contaminant levels approaches zero, with no statistically significant deviation.

**2.1.1.10. Active extraction system points of compliance**

The following bedrock monitoring wells shall serve as points of compliance for the active extraction system:

ECJ-1 (all sampled ports)  
ECJ-2 (all sampled ports)  
ECJ-3 (all sampled ports)  
MW-13  
MW-17  
MW-24  
GCA-1  
MW-6

**2.1.1.11. Active extraction system shut-down**

EPA, in consultation with DEP, will determine whether the Cleanup Standard has been achieved by using the following criteria: (1) a concentration range of 1 to 10 ppm of total VOCs; and/or (2) an asymptotic curve using groundwater monitoring data indicating that significant concentration reductions are no longer being achieved. Consistent with the Consent Decree, the Groundwater Cleanup Standards must be demonstrated at all points of compliance sampling locations for one year (four consecutive quarters) during the operation of the active extraction and groundwater treatment systems

before, upon approval of EPA, in consultation with MADEP, the active extraction and groundwater treatment systems can be shut off. Notwithstanding the foregoing, any pump may be shut off if EPA, in consultation with DEP, determines that operation of that pump is no longer contributing to the cleanup.

If EPA determines on the basis of studies submitted by the Settling Defendants and other relevant information considered by EPA, in consultation with DEP, either that achieving the Groundwater Cleanup Standards is impracticable, or that achieving groundwater concentrations lower than 1 to 10 ppm is practicable, the ROD will be amended.

**2.1.1.12. Program modification**

On its own initiative, or at the request of the Settling Defendants, EPA, in consultation with MADEP, may add or delete specific parameters, monitoring wells, or zones, and may adjust monitoring frequencies and requirements for water level measurements, depending on sampling results and observed trends.

In the case of points of compliance, monitoring wells which may be added, if any, are limited to existing, or new bedrock monitoring wells within the Disposal Area and areas north of Hathaway Road.

**2.1.1.13. Program initiation**

Compliance monitoring will be initiated three months after the treatment plant is on-line. One baseline round of ground water sampling and analysis, consistent in scope with a typical quarterly round, will be held one month before anticipated startup.

**2.1.2. Passive collection system compliance monitoring and standards**

The following components comprise the compliance monitoring program for the passive collection system:

**2.1.2.1. Sampling port**

The designated sampling port for the passive collection system shall be located on the influent line to the ground water treatment plant, after the passive collection system pump(s).

**2.1.2.2. Analytical program**

Ground water shall be sampled on a quarterly basis. For the first four consecutive quarters, ground water samples shall be analyzed for the following parameters:

PCBs (unfiltered)  
VOCs  
Metals (filtered and unfiltered)  
SVOCs

After the first four consecutive quarters, ground water samples shall be monitored for the parameters designated as cleanup standards, as described below.

**2.1.2.3. Passive collection system cleanup standard**

As described in Paragraph 15 of the Consent Decree, the cleanup standard for the passive collection system shall be "Massachusetts Water Quality Standards for the designated uses of the Unnamed Stream, as determined by EPA in consultation with the Commonwealth, after review of bio-assays and/or attainment of Ambient Water Quality Criteria (AWQCs) for specific pollutants, included but not limited to PCBs, benzene, trichloroethene, vinyl chloride, aluminum, barium, copper, iron, and lead."

Settling Defendants shall make a recommendation concerning the cleanup standard for the passive collection system, after review of the first four consecutive quarters of ground water data.

**2.1.2.4. Program modification**

On its own initiative, or at the request of the Settling Defendants, EPA, in consultation with DEP, may add or delete sampling ports and specific parameters, and may adjust monitoring frequencies depending on sampling results and observed trends.

**2.1.2.5. Program initiation**

Compliance monitoring will be initiated three months after the treatment plant is on line. One baseline round of monitoring will be conducted one month before anticipated startup.

**2.2. Performance monitoring**

The following performance monitoring program addresses Section V.C (6-7) of the SOW. Performance monitoring shall be conducted after the ground water treatment plant is shut down and after ground water cleanup standards have been demonstrated to have been

achieved through compliance monitoring. The purpose of performance monitoring is to evaluate whether achievement of the cleanup standards is sustained.

#### **2.2.1. Active extraction system monitoring**

The following components comprise the performance monitoring program for the active extraction system. Performance monitoring shall be conducted for a period of three years.

##### **2.2.1.1. Water levels**

Water levels in the monitoring wells to be sampled shall be measured prior to sampling.

##### **2.2.1.2. Bedrock monitoring wells**

The following bedrock monitoring wells shall be sampled on a quarterly schedule:

<u>Inside Disposal Area</u>	<u>Outside Disposal Area</u>
MW-13	MW-5
MW-17	MW-6
MW-24	MW-8
GCA-1	MW-10
	MW-10B

##### **2.2.1.3. Westbay monitoring wells**

The following zones in Westbay monitoring wells shall be sampled on a quarterly schedule:

ECJ1-37'	ECJ2-47'	ECJ3-51'	ECJ4-62'
ECJ1-62'	ECJ2-82'	ECJ3-91'	ECJ4-87'
ECJ1-72'	ECJ2-117'	ECJ3-126'	ECJ4-132'
ECJ1-122'	ECJ2-152'	ECJ3-146'	ECJ4-162'
ECJ1-148'	ECJ2-187'	ECJ3-236'	ECJ4-227'
ECJ1-267'		ECJ3-271'	ECJ4-245'

##### **2.2.1.4. Bedrock/Westbay analytical program**

Ground water samples from bedrock and Westbay monitoring wells shall be analyzed for the following parameters:

PCBs (unfiltered)  
 VOCs  
 Metals (filtered and unfiltered)\*  
 SVOCs\*

\*These parameters shall be analyzed on an annual basis.

Analytical methods are shown in Appendix A.

**2.2.1.5. Overburden monitoring wells**

The following overburden monitoring wells shall be sampled annually:

<u>Inside Disposal Area</u>	<u>Outside Disposal Area</u>
MW-13A	MW-5A
MR-15	MR-6
MW-16	MW-8A
	MW-10A

**2.2.1.6. Overburden analytical program**

Ground water samples from overburden monitoring wells shall be analyzed for the following parameters:

PCBs (unfiltered)  
VOCs  
Metals (filtered and unfiltered)  
SVOCs

Analytical methods are shown in Appendix A.

**2.2.1.7. Monitoring well replacement**

Consistent with the Consent Decree, Settling Defendants shall maintain and replace monitoring wells as necessary, including the multi-level monitoring wells.

**2.2.1.8. Program modification**

On its own initiative, or at the request of the Settling Defendants, EPA, in consultation with MADEP, may add or delete specific parameters, monitoring wells, or zones and may adjust monitoring frequencies and requirements for water level measurements, depending on sampling results and observed trends.

**2.2.2. Passive collection system performance monitoring**

The following components comprise the performance monitoring program for the passive collection system. Performance monitoring shall be conducted for a period of three years.

**2.2.2.1. Sampling port**

The designated sampling port for the passive collection system for performance monitoring shall be the passive collection system sump.

**2.2.2.2. Analytical program**

Ground water shall be sampled on a quarterly basis for the parameters designated as cleanup standards, as described in Section 2.1.2.

**2.2.2.3. Program modification**

On its own initiative, or at the request of the Settling Defendants, EPA, in consultation with DEP, may add or delete sampling ports and specific requirements, and may adjust monitoring frequencies depending on sampling results and observed trends.

**2.2.3. Corrective action**

If after the initial achievement of Groundwater Cleanup Standards, and (a) in the course of the monitoring to demonstrate compliance for the passive collection system described in Section 2.1 above, or (b) in the course of the monitoring to demonstrate compliance for the active extraction system described in 2.1 above; or (c) upon cessation of ground water collection and treatment and during the three-year performance monitoring period described in Section 2.3 above; or (d) during long-term monitoring described in Section 2.4 below, EPA, in consultation with DEP, determines on the basis of observed trends and sampling results that the Groundwater Cleanup Standards are not being sustained, then the Settling Defendants shall, consistent with the Consent Decree, conduct additional ground water monitoring at the direction of EPA, in consultation with DEP, and shall conduct a study to determine why the Groundwater Cleanup Standards are not being sustained. The Settling Defendants shall submit this study along with a proposal and schedule for continued collection and treatment within a timetable specified by EPA. Consistent with the Consent Decree, the Settling Defendants shall implement the proposal upon approval by EPA, in consultation with DEP.

**2.3. Long-term monitoring**

Consistent with the Consent Decree, Settling Defendants shall implement ground water monitoring to evaluate over the long-term the migration and concentrations of contaminants in the on-site

overburden and bedrock aquifers. Long-term monitoring shall be initiated after completion of performance monitoring. The details of this long-term monitoring program shall be developed during remedial action and shall be tailored to site-specific hydrogeological conditions. The scope of the long-term monitoring program for ground water shall be based on the results of the compliance and performance monitoring.



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### **3. Surface water, sediments, and soil**

The following long-term monitoring program addresses Section VI.B.2 of the SOW.

#### **3.1. Surface water**

Surface water samples will be obtained from the Un-named Stream every two years following completion of construction. Surface water samples will be collected during low flow conditions in late summer.

A total of four surface water samples will be collected per sampling event, at the following locations:

1. Upstream of the I-195 interchange
2. Immediately downstream of the Hathaway Road culverts
3. From the sedimentation basin
4. From the first golf course water hazard.

Surface water samples will be analyzed for:

pH  
PCBs (filtered and unfiltered)  
PAHs  
VOCs  
Metals (filtered and unfiltered)

Analytical methods are shown in Appendix A.

#### **3.2. Sediments**

Sediment samples will be obtained from the Un-named Stream from the same locations and at the same frequencies as the surface water samples described in Section 3.1.

Sediment samples will be analyzed for:

PCBs  
PAHs  
metals  
Total Organic Carbon

Analytical methods are shown in Appendix A.

### **3.3. Soil**

Section VI.B.2 of the SOW requires the "sampling of surficial soils shown generally in Section B of Attachment 1" of the SOW. Section B consists of the car wash property, which has been acquired by the City of New Bedford. Long-term soil sampling in Section B can not be conducted, since this section will be capped in place.

### **3.4. Program modification**

On its own initiative, or at the request of the Settling Defendants, EPA, in consultation with DEP, may add or delete specific requirements, and may adjust monitoring frequencies depending on sampling results and observed trends.

### **3.5. Corrective action**

Collected surface water data will be compared to historical data, upstream data, EPA Ambient Water Quality Criteria, and Massachusetts Surface Water Standards. The need for corrective action will be evaluated based upon this comparison.

Collected sediment data will be compared to historical data and the site-specific clean-up standards. The need for corrective action will be based upon this comparison.

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## **4. Wetlands**

### **4.1. Wetlands monitoring program**

Settling Defendants shall assess the success of the wetlands restoration. This assessment shall be conducted annually for the first three years after the initial restoration is completed. Consistent with the Consent Decree, the wetlands restoration shall then be assessed again during the fifth year after initial restoration and every five years thereafter. All assessments shall occur during the late summer at the end of the growing season. Upon approval by EPA, in consultation with DEP, assessments may be added or deleted depending on previous assessment results.

### **4.2. Wetlands restoration requirements**

Consistent with the Consent Decree, Settling Defendants' restoration obligations will be considered complete when the affected wetlands are returned to conditions existing prior to Remedial Action (pre-remediation conditions) within plus or minus fifteen percent, as measured by comparing the percent of herbaceous and woody cover existing within the wetland area likely to be impacted by the remedial activities under pre- and post- remediation conditions. Pre-remediation conditions are documented in the report entitled "Wetlands Characterization", Sullivan's Ledge Superfund Site, New Bedford, Massachusetts (O'Brien & Gere Engineers, Inc., September 1995).

### **4.3. Corrective action**

Consistent with the Consent Decree, Settling Defendants shall re-implement wetlands restoration if EPA determines, in consultation

with DEP, based on subsequent assessment results, that the performance standards of the wetlands restoration have not been met due to ineffective wetlands restoration. Consistent with the Consent Decree, Settling Defendants shall perform periodic maintenance (e.g. planting), as determined necessary by EPA, in consultation with DEP, to ensure final restoration of the designated wetland areas.

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## **5. Landfill gas**

### **5.1. Landfill Gas Monitoring Program**

#### **5.1.1. Explosive gases**

The perimeter gas monitoring wells at the Disposal Area will be monitored quarterly for explosive gases using an infrared gas analyzer, such as the Land Tech GA-90, or equivalent. The infrared gas analyzer will be capable of analyzing for methane, carbon dioxide, and oxygen.

Samples will be collected from the perimeter monitoring wells prior to purging to simulate gas build-up in a closed space. During sampling events for explosive gases, it is also necessary that the perimeter gas monitoring wells be in equilibrium with subsurface conditions. Therefore, following the initial sample, the perimeter monitoring wells will be purged of two bore volumes and sampled again. Purging may be accomplished by the use of an aspirator or a portable vacuum pump.

The infrared gas analyzer will be calibrated daily, before use, in accordance with the manufacturer's recommendations.

#### **5.1.2. Hydrogen sulfide**

The perimeter gas monitoring wells at the Disposal Area will be monitored annually for hydrogen sulfide, using a portable gas analyzer such as the Lumidor Micro-Max, or equivalent. Samples for hydrogen sulfide will be obtained after sampling for explosive gases, and after purging. The portable gas analyzer will be calibrated daily before use, in accordance with the manufacturer's recommendations.

**5.1.3. Volatile organic compounds**

On an annual basis, representative perimeter gas monitoring wells will be sampled for volatile organic compounds using SUMMA canisters. The samples obtained by the SUMMA canisters will be analyzed at an off-site laboratory for volatile organic compounds using EPA Method TO14. Samples for volatile organic compounds will be obtained after sampling for explosive gases, and after purging. A total of six perimeter monitoring wells will be selected for VOC analysis per year, based on the relative location and the results of quarterly analysis for explosive gases.

**5.2. Program modification**

On its own initiative, or at the request of the Settling Defendants, EPA, in consultation with DEP, may add or delete specific requirements, and may adjust monitoring frequencies depending on sampling results and observed trends.

**5.3. Corrective action**

If the concentration of explosive gases at the perimeter monitoring wells exceeds twenty-five percent of the lower explosive limit (LEL) for individual constituents or total LEL, Settling Defendants shall

- Notify EPA and DEP within fourteen days of the finding
- Initiate an evaluation of appropriate corrective measures.

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## **6. Ground water treatment plant monitoring**

### **6.1. Introduction**

This section describes the ground water and air monitoring proposed for the ground water treatment plant.

### **6.2. Ground water treatment plant monitoring**

The following ground water treatment plant monitoring addresses Section V.C (5) of the SOW. Ground water treatment plant monitoring shall be conducted while the ground water treatment plant is operating.

#### **6.2.1. Influent monitoring**

The six bedrock recovery wells will be sampled for the same parameters and with the same schedule described for the bedrock monitoring wells, as described in Section 2.1.1. Sampling will be conducted using installed recovery pumps.

The shallow collection system will be characterized as described in Section 2.1.2.

#### **6.2.2. Effluent monitoring**

Effluent from the ground water treatment plant will be discharged to the City of New Bedford POTW. Effluent will be monitored in accordance with City POTW requirements, as described in the City of New Bedford letter dated June 30, 1994. Specifically, upon initial startup, daily samples will be collected to evaluate treatability effectiveness, for approximately thirty days. After this period, and after the treatment plant operation has stabilized and been demonstrated to be effective, discussions will be held with the City concerning progressively decreasing the effluent monitoring.

Effluent monitoring will be conducted for the following parameters:

- VOCs
- PCBs
- arsenic
- cadmium
- chromium (hexavalent)
- chromium (total)
- copper
- cyanide
- lead
- mercury
- nickel
- silver
- zinc

Analytical methods are shown in Appendix A.

### 6.3. Air

The air discharge from the carbon beds on the tank venting system will be monitored weekly for volatile organic compounds using Drager tubes for benzene, trichloroethylene, and vinyl chloride. Samples will be withdrawn from the bed 2 ft below the discharge point from a sampling port.

The concentration of VOCs in the influent to the carbon beds will be monitored periodically, after treatment plant startup and stabilization. After one year of operation, the frequency of air effluent monitoring will be re-evaluated, based on the overall mass loading of VOCs to the ground water treatment plant, the concentrations of VOCs detected in the carbon bed influent, and the site-specific data on carbon use.



## Appendix A



O'BRIEN & GERE  
ENGINEERS, INC.

## Appendix A - Analytical methods

Parameter	Matrix	Analytical Method
VOCs	ground water	SW5030/SW8240
	surface water	SW5030/SW8260
SVOCs	ground water	SW3520/SW8270
PCBs	ground water surface water	SW3520/SW8080 or SW8081
	sediment	SW3550/SW8080 or SW8081
Metals (except mercury)	ground water surface water	SW3010/SW6010 (1)
	sediment	SW3050/SW6010
Mercury	ground water surface water	SW7470
	sediment	SW7471
pH (Field Test)	surface water	EPA 150.1
PAHs	surface water	SW3520/SW8310
	sediment	SW3550/SW8270
Total Organic Carbon	sediment	Llyod Kahn Method
<p>Table Notes.</p> <p>SW - <i>Test Methods for Evaluating Solid Wastes, Physical and Chemical Methods, SW-846 Third Edition, UpDate II</i>, USEPA, September 1994, or most recent edition</p> <p>EPA - <i>Method for the Chemical Analysis of Water and Wastewater, EPA 600-4-70-020</i>, USEPA, 1983</p> <p>Llyod Kahn Method - <i>Determination of Total Organic Carbon in Sediment</i>, USEPA Region II, Environmental Sciences Division, Monitoring Management Branch, Edison, New Jersey, July 27, 1988.</p> <p>(1) SW7000 series methods may be used in place of method SW6010 for metals analyses depending on detection limits required.</p>		